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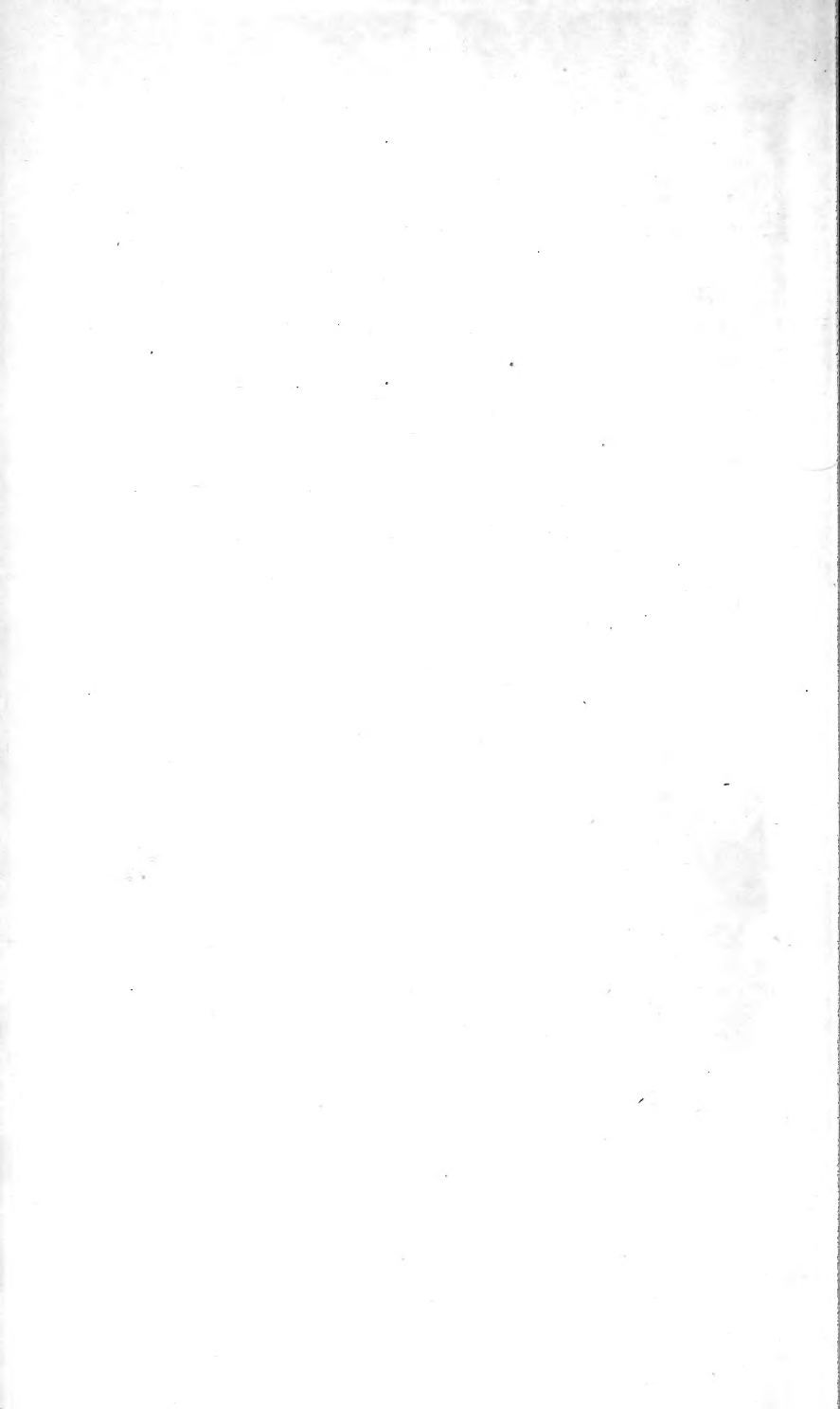
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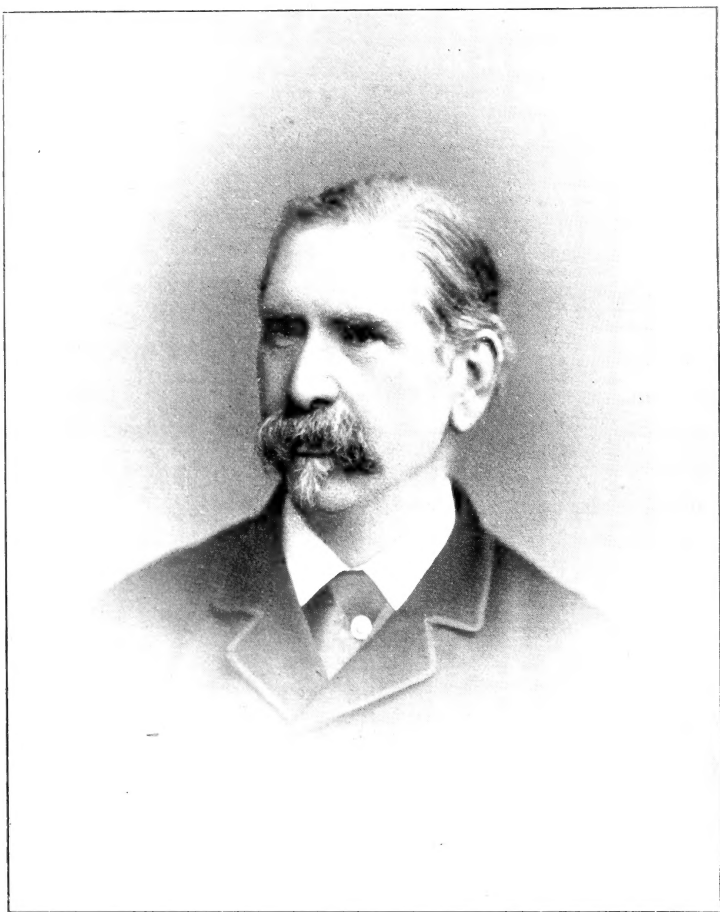
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THE IRISH NATURALIST.

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Ulster Fisheries and Biology Association.*

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R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.,

AND

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LEAFLETS.

Number.	Name.
Leaflet No. 1	The Warble Fly.
" " 2	<i>Out of Print.</i>
" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as food for Calves.
" " 6	Charlock Spraying.
" " 7	Fluke in Sheep.
" " 8	Timothy Meadows.
" " 9	The Turnip Fly.
" " 10	Wireworms.
" " 11	Prevention of White Scour in Calves (Professor Nocard).
" " 11a	do. do. do.
" " 12	<i>Out of print.</i>
" " 13	Contagious Abortion in Cattle.
" " 14	Prevention of Potato Blight.
" " 15	Fertilizers and Feeding Stuffs Act, 1893.
" " 15a	Fertilizers and Feeding Stuffs (Amendment) Regulations, 1904.
" " 16	Sheep Scab.
" " 17	The Use and Purchase of Manures.
" " 18	Swine Fever.
" " 19	Early Potato Growing.
" " 20	Calf Rearing.
" " 21	Diseases of Poultry :—Gapes.
" " 22	Basic Slag.
" " 23	Dishorning Calves.
" " 24	Care and Treatment of Premium Bulls.
" " 25	Fowl Cholera.
" " 26	Winter Fattening of Cattle.
" " 27	Breeding and Feeding of Pigs.
" " 28	Blackleg, Black Quarter, or Blue Quarter.
" " 29	Flax Seed, 1904.
" " 30	Poultry Parasites—Fleas, Mites, and Lice.
" " 31	Winter Egg Production.
" " 32	Rearing and Fattening of Turkeys.
" " 33	Profitable Breeds of Poultry.
" " 34	The Revival of Tillage.
" " 35	The Liming of Land.
" " 36	Field Experiments, 1903—Barley.
" " 37	" " Meadow Hay.
" " 38	" " Potatoes.
" " 39	" " Mangolds.
" " 40	" " Oats.
" " 41	" " Turnips.
" " 42	Permanent Pasture Grasses.
" " 43	The Rearing and Management of Chickens.
" " 44	" Husk " or " Hoose " in Calves.
" " 45	Ringworm on Cattle.
" " 46	Haymaking.
" " 47	The Black Currant Mite.
" " 48	Foul Brood or Bee Pest.
" " 49	Poultry Fattening.
" " 50	Portable Poultry Houses.
" " 51	The Leather-Jacket Grub.
" " 52	Flax Experiments, 1903.

Copies of the above leaflets can be obtained free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

The Irish Naturalist.

VOLUME XIV.

SOME MOSSES FROM COUNTY DOWN.

BY J. H. DAVIES.

AMONGST recent gatherings of mosses in County Down there are some which, besides being additions to the county list, are of considerable rarity in Ireland. The names and localities of these are here put in the form of a short list; and the opportunity has been used for noting additional stations for a few of the rarer or less frequent species previously recorded from the county.

They were met with mainly in the valley of the Upper Bann, but some of them by the sea-coast at Newcastle and near Killybegs. Parts of the River Bann possess features of much interest, and invite scrutiny. At Knocknagor, for example, the river is picturesquely rocky, the banks being high and well-wooded. But there the rush of water is generally such that the bed of the river is not accessible for close examination. Even in times of drought that is so, the water then, for industrial purposes, being let down by the Bann Reservoir Company, from the extensive storage dam at Lough Island Reavy. Taking advantage of a week-end afternoon, when the water was unusually low, I had the satisfaction of gathering there *Fissidens decipiens*, a species which in Ireland was known hitherto only from Killarney, where it was detected by Wilson in 1866. Another *Fissidens*, of yet greater interest, also found there, was *F. rufulus*. Not only was it in a good state of fructification, but in so great abundance,—growing on the face and in the crevices of the rocks, that are nearly always submerged—that one might take as much as he needed without feeling that he was committing a botanical theft. Once before I had found it some distance higher up the same river, but in that case sterile and only sparingly; the Bann being the only Irish river in which it is known to occur. The finding of it in fruit removes any possible doubt that might have

existed as to the correct identification of the barren plant. Mr. Dixon obligingly assures me that "Your *Fissidens* is certainly identical with the English *F. rufulus*."

At the same place there was noticed an unusual alga which, in my examination of similar situations, I had never seen before. It proved to be the rare *Cladophora ægagropila*, of which a separate note is given on another page. It may be anticipated that yet other rarities will be found there.

The unexpected revelation of *Weisia calcarea* on a wall at Lenaderg "seemed like a vision of delight." Not only is it a very beautiful little plant, but is as rare as it is interesting. Moore, on the authority of the late Isaac Carroll, records it doubtfully from Cork, the only other Irish county in which it is known to occur. Not depending on my own examination of some of Carroll's original specimens I sent them to Mr. Dixon, who says "The Cork plant is also quite correct."

Of mosses met with on the coast there are two or three which, I think, may be accounted worthy of special mention. Thus, *Trichostomum mutabile*, var. *cophocarpum*, rare in Britain, had not previously been indicated, as such, from Ireland. Mr. Dixon, however, is strongly convinced, by his examination of original examples, that the plant found by Dr. Lindberg at Killarney in 1873, described by him as *Mollia lutescens*, and, under that name, figured as a separate species in *British Moss Flora*, is the same as the present plant. Other noteworthy mosses from Newcastle are *Barbula recurvifolia* and *Weisia crispata*. The former, Moore knew only from counties Kerry and Sligo, and *Weisia crispata*, which is one of the new British species described in the recently published second edition of *Student's Handbook of British Mosses*, was before known as Irish from a single station in Donegal¹.

Very gratifying, too, was it to collect at Ringfad Point a plant, which, following the nomenclature of Mr. Dixon, is below set down as *Amblystegium filicinum*, var. *Vallisclausæ*. In Ireland, I think, it had been found only in the Shannon, whence it was lately reported by a lady botanist². Authors

¹ J. Hunter: North Donegal Mosses. *Journ. Bot.*, vol. xl., p. 191.

² Miss Armitage: Mosses of Co. Limerick. *Ib.*, p. 226.

differ as to the true place of this well-marked moss, some claiming that it ought to be ranked as a distinct species: and, indeed, Dr. Braithwaite, in *British Moss Flora*, assigns it that position under the name of *Amblystegium fallax* Milde. It is described as aquatic, and as occurring in calcareous springs. The locality at Ringfad Point is an escarpment of Boulder-clay, damp by water oozing from a superincumbent deep bed of gravelly drift. There is evidence that the water contains lime in solution, thus supplying a suitable matrix. There seems to be no instance at this part of the coast, of the occurrence of limestone at the surface. But, whether derived from lime contained in the drift, as has been indicated by Mr. Praeger¹, or from "calcareous bands that occur interbedded among the Silurian rocks of that locality" as maintained by Mr. William Gray, there are considerable calcareous deposits. Thus, on the Ardtole side of Ardglass Bay, for example, there are two caverns, neither of any great extent, in and around which are masses of this deposit. On this several lime-loving mosses luxuriate, notably *Weisia verticillata* and *Hypnum commutatum*, thickly encrusted, as is usual, much of the former species being so entirely embedded that its presence, in that case, is denoted only by the inequality of the surface.

Polytrichum gracile, Dicks.—Heathy places near Gilford and Ballyronev.

P. formosum, Hedw.—Frequent at roots of trees about Lenaderg. A common moss in England, for which Moore, in 1873, could give only two Irish stations. Since then it has been found by Revs. Waddell and Lett in this county. No doubt it has often been confused with *P. commune*, and is probably not uncommon throughout Ireland.

P. commune, Linn., var. **minus**, Weis, including var. *fastigiatum*, Lyle.—On peaty ground at the bog near Gilford. So far as was observed only the barren stems are fastigiately branched, the fertile alone being simple or nearly so, both growing together in the same tufts. I do not know that this moss has been previously recognised in Ireland.

Blindia acuta, B. & S.—Descends nearly to sea level, in company with *Hycomium flagellare*, in the Shimna River, near Newcastle. A slender state, with leaf-form very near that of var. *trichodes*.

¹ *Irish Nat.*, xi., 207. 1902.

- Flissidens incurvus**, De Not.—Frequent on banks at and in the neighbourhood of Lenaderg. An addition to the county list, and seems to be rare in Ireland.
- F. bryoides**, Hedw., var. = **F. Inconstans**, Schp.—On decayed wood and on stones in R. Bann at Lenaderg. A very curious little *Flissidens*, in which the fruit, although not actually axillary, is on a very short lateral branch at the apex of the stem, often two setæ springing from one perichætium. Mr. Bagnall, who has gathered the moss in England, has examined some of the specimens sent to Mr. Dixon, and says it agrees well with what he has seen of it before. Dr. Braithwaite, Mr. Dixon, and some other authors do not admit it as a distinct species, but regard it rather as a curious form or sport. The time of fruiting (May, 1904), and habitat are different from those of *F. bryoides* proper.
- F. rufulus**, B. & S.—Abundant in fissures and on the face of rocks in swiftly-running water in R. Bann at Knocknagor. *C. fr.*, 12th July, 1904. Very rare.
- F. decipiens**, De Not.—Rocks by the Bann at Knocknagor. Very rare in Ireland.
- F. taxifolius**, Hedw.—An unnamed variety of this common species occurs, mostly under water, on stones and on decaying wood, in several places on the Bann at Lenaderg and Stramore. A tall plant with setæ from the middle of the stem. In specimens from one locality the characters are still more abnormal, the leaves being longer, more acute, and the nerve distinctly vanishing below the apex. Mr. Dixon and Mr. Salmon have this under consideration, and think it probably merits description as a variety. The same plant had previously been found in one or two places in England.
- Grimmia trichophylla**, Grev.—Walls at Lisnafiffy.
- Pottia minutula**, Fühnr.—By the sea at Ringfad Point.
- Barbula recurvifolia**, Schp. (*B. reflexa*, Brid.).—In sand on the right bank of the mouth of the Shimna River at Newcastle. A strong form approaching var. *robusta*, but not that. Moore's plant from Ben Bulbin has been noted as that, but it is not so stated in his *Synopsis*.
- Welsia crispata**, C. M.—Rather plentiful on the shady side of "The Rock" at Newcastle. Very rare in Ireland.
- W. calcarea**, C. M.—Abundant in large dense patches on a lime-washed brick wall at Lenaderg. Sterile. The Cork plant, also sterile, mentioned above, Mr. Dixon adjudges to be an extreme form of var. *mutica*, Boul.
- W. verticillata**, Brid.—On calcareous deposit at Ardglass Bay.
- Trichostomum mutabile**, Bruch, var. **cophocarpum**, Schp.—On "The Rock" at Newcastle. The type, as recorded in *Fl. N.-E. I.* still grows there, and var. *littorale* was noticed at the same spot, but these two mosses are not infrequent along the coast.
- Bartramia ithyphylla**, Brid.—Rocks by R. Bann at Knocknagor.

Bryum murale, Wils.—Old walls at Gilford.

Heterocladium heteropterum, B. & S.—On rocks and earth by the stream flowing in the Banu at Lenaderg.

Var. **fallax**, Milde.—On stones by R. Bann at Stramore. A rare and well-marked moss for which there are only two other Irish stations.

Eurhynchium speciosum, B. & S.—Bank by R. Bann at Lenaderg.

Amblystegium serpens, B. & S., var. **angustifolium**, Limpr. (*A. angustifolium*, Lindb.)—On decaying wood at Tullyconnaught. A very long, narrow-leaved plant, with narrow, elongated cells. It has been found in one or two places in England, but, I think, not before in Ireland.

A. filicinum, De Not, var. **Vallisclausæ**, Dixon (*A. fallax*, Milde).—On damp Boulder clay at Ringfad Point. A slender form of *A. filicinum*, coming very near var. *gracilescens*, occurs on calcareous deposit at Ardglass.

Hypnum exannulatum, Gümb.—In bog-holes, Drumnagalley Bog. Var. **stenophyllum** (=var. *falcifolium*, Ren.)—In other bog-holes at the same place.

H. ochraceum, Turn.—Rocks in R. Bann at Tullyconnaught.

H. cordifolium, Hedw.—Very abundant and fruiting freely in marshy margins of Drumnagalley Bog. It takes there the place usually held by *H. cuspidatum* in like situations.

Lenaderg, Co. Down.

SOME IRISH BRAMBLES.

BY R. A. PHILLIPS.

IN the following notes are embodied the results of some gatherings of Irish *Rubi* made by me as opportunities occurred during the past summer.

The majority of the specimens were taken on or near the banks of the Shannon in Clare and Limerick, and to the lists for each of these counties I have been able to add several species, one of which (*R. criniger*) is new to Ireland. Other records comprise three additions to Cork East, one to Tipperary North, and one to Galway North-east.

One of the most interesting specimens was that of *R. hesperius*, Rogers, a plant hitherto known to exist only in the districts to the north and north-east of Lough Corrib in Galway and Mayo.

About 120 specimens were collected altogether and submitted to the Rev. W. Moyle Rogers, whose kindness in examining and identifying my gatherings, on this as well as on several previous occasions, I desire to gratefully acknowledge. Several of them appear to be new or undescribed forms, and these have been held over for further material and investigation; some others are interesting-looking hybrids of doubtful parentage.

Additions to the county or vice-county lists of "Irish Topographical Botany" are indicated by having the county names printed in capitals:—

Rubus Idæus, L. —Exceedingly abundant in the vicinity of the bog north of Castleconnell.

R. plicatus, Wh. & N.

8. LIMERICK. Near the bog at Castleconnell.

R. rhamnifolius, Wh. & N.

8. LIMERICK. By the Shannon at Castleconnell.

9. CLARE. Near the woods and on a railway embankment at Cratloe.

R. pulcherrimus, Neum.

8. Limerick. Castleconnell and Plassy.

9. CLARE. Near Cratloe Woods.

R. Selmerii, Lindb.

5. CORK E. The Glen, Cork.

8. Limerick. Bank of the Shannon near Plassy.

R. argentatus, P. J. Muell.

8. LIMERICK. By the Shannon below Castleconnell.

R. rusticanus, Merc.—Abundant in all districts. Specimens from Cratloe were the first from Clare seen by Mr. Rogers. The plant does not seem to vary much, but some pretty forms were found near Plassy.

R. myricæ, Focke, var. **hesperius**, Rogers.

8. LIMERICK. Near the Shannon north of Castleconnell. Mr.

Rogers writes of this, "a most interesting new county record."

R. macrophyllus, Wh. & N.

8. LIMERICK. Plassy and Castleconnell.

9. CLARE. Doonass and Cratloe.

R. Schlechtendalii, Weihe.

8. Limerick. Castleconnell and Plassy.

9. CLARE. Wood near Doonass (*f. umbrosa*), Cratloe and Killaloe. An abundant and widely distributed bramble.

R. pyramidalis, Kalt.

9. CLARE. Killaloe and Cratloe (*f. umbrosa*): frequent near the Shannon.

10. TIPPERARY N. Ballina.

Rubus leucostachys, Schleich.

17. GALWAY N.E. Abundant among limestone crags east of Gal way excluding nearly all other species.

R. criniger, Linton.

9. CLARE. Roadside hedges near Killaloe. New to Ireland, the supposed *R. criniger* recorded for Co. Down in "Irish Topographical Botany" being now referred by Rev. W. Moyle Rogers to the allied *R. Lettii*, not distinguished until after the publication of that work. A full description and account of the particulars in which the two species differ is given by Mr. Rogers in *Journ. Bot.*, 1901, p. 381.

R. anglosaxonicus, Gelert.

8. LIMERICK. A remarkable variety at Castleconnell by the Shannon.

R. radula, Weihe.

8. Limerick. Near Plassy.

R. oligocladius, Muell. & Lefv.

9. CLARE. Cratloe Woods. "Specimens a little off type towards var. *Bloxamianus* Colem."—W.M.R.

R. podophyllus, P. J. Muell. (*sp. coll.*)

9. CLARE. Cratloe Woods, a strongly armed form.

R. mutabilis, Genev.

5. CORK E. The Glen, Cork. This appears to be a very rare species in Great Britain and Ireland.

R. scaber, Wh. & N.

8. LIMERICK. Near Castleconnell.
9. CLARE. Killaloe (*f. umbrosa*) apparently. Would be new to Co. Clare if confirmed.

R. longithyrslger, Bab., var. *botryeros*, Focke.

5. CORK E. The Glen, Cork. The second record for Ireland.

R. Koehleri, Wh. & N.

8. Limerick. Edge of a wood at Foynes, confirming Mr. S. A. Stewart's record of 1890.

R. serpens, Weihe.

9. CLARE. Cratloe Woods, apparently abundant.

R. dumetorum, Wh. & N.

8. Limerick. Near Lucas Lough and Castleconnell.
9. CLARE. Doonass.

R. cæsius, Linn.

8. LIMERICK. Castleconnell, Plassy, and Corbally.
9. CLARE. Doonass, Killaloe, Parteen. Abundant along the course of the Shannon, hybridizing freely with *R. dumetorum* and apparently, with other species.

R. saxatilis, L.

8. Limerick. By the Shannon below Castleconnell.

NOTES ON THE MOLLUSCA OF THE NORTH-EAST OF CO. WICKLOW.

BY P. H. GRIERSON.

THE following notes may be of interest, as they add 56 new records for Co. Wicklow to the Census of the British Land and Fresh-water Mollusca published in 1902.

The animals were all taken in the months of August and September last year, with the exception of some taken on 6th April last, and are confined to one inch Ordnance Map, 121, except a few which are specially noted.

I have, as usual, followed Dr. Scharff's nomenclature as given in *Irish Naturalist*, 1892.

I have to thank Mr. Chas. Oldham, who has kindly looked through all the specimens, and given me names of the varieties, &c. (with the exception of a few slugs submitted to Mr. R. Denison Roebuck):—

Vitrina pellucida, Müll.—This widely distributed shell is very common in the Glen of the Downs and Powerscourt Demense.

Hyalinia cellaria, Müll.—Very plentiful under stones, &c., Powerscourt Waterfall and Enniskerry.

H. alliarla, Miller.—Not common. At Powerscourt Waterfall I took var. *viridula*.

H. nitidula, Drap.—Common; taken at Powerscourt Waterfall, Greystones, and Enniskerry.

H. pura, Alder.—Common among damp moss in suitable situations. Glen of the Downs, Bray; and at Enniskerry I took var. *nitidosa*.

H. radiatula, Alder.—Rather common at Enniskerry, and var. *viridescenti-alba* at Powerscourt Waterfall.

H. crystallina, Müll.—Very plentiful among damp moss and leaves at the Glen of the Downs and Enniskerry.

H. fulva, Müll.—Not uncommon in situations similar to the last named; taken at Powerscourt Waterfall, in Powerscourt Demense near the House, and near Enniskerry on the Bray road.

Arlon ater, L.—Very common. The following varieties noted:—*brunnea* at Greystones; vars. *livida*, *fasciata* and *marginata* at Enniskerry.

A. subfuscus, Drap.—Taken at Powerscourt Waterfall, and var. *rufofusca* at Enniskerry.

A. hortensis, Fér.—Very common; taken at Enniskerry and Greystones.

A. circumscriptus, Normand.—Fairly common among damp leaves, taken near Powerscourt Waterfall.

- Limax maximus**, L.—Common. Var. *obscura* found at Greystones, and var. *fasciata* at Enniskerry.
- L. flavus**, L.—Found only a few specimens at Greystones and Enniskerry; at the latter place I took var. *flavescens*.
- L. marginatus**, Müll.—Common. Noted at Greystones and Enniskerry.
- Agriolimax agrestis**, L.—To be found everywhere. Observed at Greystones, near Powerscourt Waterfall, and var. *pallida* at Enniskerry.
- A. lævis**, Müll.—Fairly common in moist places in Powerscourt Demense.
- Amalia Sowerbyi**, Fér.—Greystones; var. *rustica* at Enniskerry. Common in gardens, &c.
- A. gagates**, Drap.—Taken at Greystones, also var. *plumbea*.
- Helix pygmæa**, Drap.—Common among leaves under plantations; found at Glen of the Downs and Powerscourt Demense.
- H. rotundata**, Müll.—Very common. Noted at Powerscourt Waterfall and at Enniskerry.
- H. pulchella**, Müll.—Not common. Taken at Enniskerry, also var. *costata*.
- H. lamellata**, Jeff.—Very plentiful at Glen of the Downs, also taken at Powerscourt.
- H. hispida**, L.—Very common. Noted at Powerscourt Waterfall, Greystones, and Enniskerry.
- H. rufescens**, Penn.—Very common on walls along roadsides. Var. *alba* at Greystones and at Enniskerry.
- H. fusca**, Mont.—Very common in Powerscourt Demense; also var. *vitrea*, not found elsewhere.
- H. virgata**, Da Costa.—Common at Greystones and at Enniskerry, with var. *lutescens*.
- H. intersecta**, Poir.—Fairly common at Greystones and Enniskerry.
- H. ericetorum**, Müll.—Along railway bank at Greystones.
- H. acuta**, Müll.—Enniskerry, var. *strigata*; not common. Common at Greystones.
- H. nemoralis**, Müll.—Common. The following noted:—Powerscourt and at Enniskerry, var. *rubella* 00000 and 00300, and var. *libellula* 003.00.12345. (12) (345).
- H. hortensis**, Müll.—Common in neighbourhood of Enniskerry, but only to be seen, as a rule, after rain. Very plentiful on Scalp road. The following varieties were noted—*roseolabiata*, *lutea*, and *arenicola*.
- H. aspersa**, Müll.—Common. Noted at Greystones and Enniskerry.
- Bullimus obscurus**, Müll.—Very common about Enniskerry; to be found on many roadside walls after rain; these are built of granite. It is the first time I have taken these shells away from a limestone district. I found one specimen of var. *albina*.
- Cochlicopa lubrica**, Müll.—Very common. Noted at Powerscourt Waterfall and at Enniskerry.

- Pupa anglica**, Fér.—Plentiful, Powerscourt Waterfall; and var. *pallida* at Enniskerry and near Sugar-loaf Mountain.
- P. cylindracea**, Da Costa.—Very common at Greystones, Glen of the Downs, Powerscourt, Enniskerry, and Bray.
- P. muscorum**, Müll.—Taken on a wall close to Enniskerry; apparently rare.
- Vertigo edentula**, Drap.—Not rare. Taken at Powerscourt Waterfall and at Enniskerry.
- V. pygmæa**, Drap.—Rather rare. A few specimens taken at Bray.
- V. substriata**, Jeff.—Found at Powerscourt Waterfall.
- V. antivertigo**, Drap.—Found at Powerscourt Waterfall, and also in the demense.
- Clausilia bidentata**, Ström.—Noted at Powerscourt Waterfall and at Enniskerry; to be found in most suitable situations.
- Succinea putris**, L.—Common. Taken at Enniskerry, Powerscourt Demense, and at Hollybrook.
- S. elegans**, Risso.—Taken in Powerscourt Demense.
- Carychium minimum**, Müll.—Very common in marshy and damp situations; taken at Glen of the Downs, Powerscourt Waterfall, near Sugar-loaf Mountain, and at Enniskerry.
- Limnæa peregra**, Müll.—At Enniskerry, and var. *inflata* fairly common.
- L. palustris**, Müll.—In Powerscourt Demense. Not common.
- L. truncatula**, Müll.—In Powerscourt Demense. Rather rare.
- Physa fontinalis**, L.—Near Sugar-loaf Mountain and in Hollybrook Lake. Not common.
- Planorbis marginatus**, Drap.—I took this in Hollybrook Lake, but could not find it elsewhere.
- P. albus**, Müll.—In Hollybrook Lake. Rare. Also near Devil's Glen, in Ordnance Sheet 130.
- P. glaber**, Jeff.—Near Sugar-loaf Mountain and in Hollybrook and Powerscourt Lakes. It is very common in these lakes, and grows to a larger size than I have seen it elsewhere. I took one scalariform example.
- P. crista**, L.—Fairly common in Hollybrook Lake, with var. *crista*.
- P. fontanus**, Lightf.—Rather plentiful in Powerscourt Lake. I did not take it in other localities.
- Ancylus fluviatilis**, Müll.—In river at Enniskerry. Rather common.
- Acme lineata**, Drap.—Common in damp shaded situations. Taken at Glen of the Downs, Powerscourt Demense, and along Bray road, near Enniskerry.
- Bythinia tentaculata**, L.—In Hollybrook Lake. I did not find it elsewhere.
- Sphærlum corneum**, L.—In Hollybrook Lake. I did not take it in other places.
- S. lacustre**, L.—Found a few specimens in Powerscourt Lake.
- Plsidium nitidum**, Jen.—Common in the Deerpark Lake, Powerscourt.

- P. fontinale**, Pfr.—Common. Taken near Sugar-loaf Mountain, Hollybrook and Powerscourt Lakes, and in Ordnance Sheet 130, near Devil's Glen.
- P. millum**, Held.—Found in Hollybrook and Powerscourt Lakes, and in Deerpark Lake, Powerscourt, and in Ordnance Sheet 130, near Devil's Glen.
- P. pusillum**, Gmel.—Very common. Hollybrook and Powerscourt Lakes, near Sugar-loaf Mountain, by Bray road, Enniskerry, and var. *cinerea* in the Deerpark Lake, Powerscourt.

Clondalkin.

THE DOUGLAS COLLECTION IN THE HERBARIUM OF THE NATIONAL MUSEUM.

BY MISS M. C. KNOWLES.

This is a collection of plants from the County Kildare, which was made by Mr. John Douglas, of Straffan, in the years 1864 and 1865, for the Marquis of Kildare, who presented it to the Royal Dublin Society. From this Society it came into possession of the National Museum, and has now been incorporated in the general Irish Herbarium. It consisted of mounted specimens of 472 species, with dates and localities. Of these, 410 are flowering plants and ferns; the remaining 62 being mosses, liverworts, and lichens. The collection, with a list of the plants in it, was originally contained in a large green leather portfolio lettered on the outside—

Collection of Dried Plants
From the County Kildare,
Presented to
The Royal Dublin Society
by
The Most Noble the Marquis of Kildare.
Collected by Mr. John Douglas.
1864-1865.

The authors of 'Cybele Hibernica' mention having received a list of Kildare plants from Mr. Douglas when collecting material for that book, and the collection contains specimens of almost all those recorded in 'Cybele' under his name. One of them, *Carduus nutans*, from Castle Dillon, Straffan, has not

been refound. The second edition of 'Cybele' says it seems to have been little more than a casual in this station, and 'Irish Top. Bot.' refers the Cork, Kildare, and Antrim records for this plant to casuals or errors. The likely explanation seems to be that it was a case of mistaken identity, as the specimen in the collection labelled "*Carduus nutans*, gravelly fields, Castle Dillon, Straffan, June, 1864," is *Carduus crispus*. In going through the collection before incorporating it, I made notes of some plants that are new to Co. Kildare, and of new stations for a few of the rarer species. These are given in the list below, the new county records being printed in capitals. I am much obliged to Mr. Praeger for giving me his opinion about the specimen labelled *Carduus nutans*, and I would like to thank Mr. A. Bennett for confirming my correction of the names of some other plants in this collection.

Thalictrum flavum, Linn.—Boggy land, Kilkea, 1865.

Ranunculus Auricomus, Linn.—Wood at Lodge Park, April, 1864.

***PAPAVER SOMNIFERUM**, Linn.—Near Celbridge, July, 1864.

***Cheiranthus Cheiri**, Linn.—Tower, Kildare, May, 1864.

SISYMBRIUM THALIANUM, J. Gay.—Wall at Straffan church, April, 1864.

†**Reseda lutea**, Linn.—Limestone cliffs near Lucan, August, 1864.

Viola lutea, Huds.—Hill of Lyons, August, 1864.

***SAPONARIA OFFICINALIS**, Linn.—Ballytore, 1865.

[**SILENE ARMERIA**, Linn.—Waste ground, Lodge Park, August, 1864.]

Lychnis dioica, Linn.—Naas, July, 1864.

†**Lychnis vespertina**, Sibth.—Wood at Harristown, June, 1864.

†**Lychnis Githago**, Scop.—Kilkea, July, 1865.

Arenaria trinervia, Linn.—Barberstown Castle, May, 1864.

***HYPERICUM CALYGINUM**, Linn.—Wood at Lodge Park, August, 1864.

†**Malva moschata**, Linn.—Gravelly bank, side of canal near Lycns, August, 1864.

Ulex Gallii, Planch.—Corballis Hill, near Castledermot, 1865.

†**MELILOTUS OFFICINALIS**, Lam.—Quarry at Lyons. rare, August, 1864.

LOTUS ULIGINOSUS, Schkuhr.—Kilkea, 1865.

SAXIFRAGA GRANULATA, Linn.—The Park at Harristown, May, 1864.

Myriophyllum spicatum, Linn.—Liffey at Straffan, July, 1864.

†**FENICULUM OFFICINALE**, All.—Chalky cliffs, road near Lucan, 1864.

Valerianella olitoria, Poll.—Bridge at Belan, June, 1865.

†**Valerianella dentata**, Poll.—Castle Dillon, June, 1864.

FILAGO GERMANICA, Linn.—Gravelly places near Castle Dillon, 1864.

Antennaria dioica, R. Br.—Ovidstown, Straffan, June, 1864.

GNAPHALIUM ULIGINOSUM, Linn.—Sandy ground, banks of Liffey, June, 1864.

- ‡**Anthemis Cotula**, Linn.—Corn-fields, Hill of Castlewarden, August, 1864.
- ‡**Artemisia Absinthium**, Linn.—Kilkea, July, 1865.
- Carlina vulgaris**, Linn.—Gravelly fields near Kilkea Castle, July, 1864.
- ARCTIUM MAJUS**, Bernh.—Lodge Park, August, 1864.
- †**Carduus crispus**, Linn.—Gravelly fields, Castle Dillon, Straffan June, 1864.
- ***Centaurea Cyanus**, L.—Kilkea, July, 1865.
- ***Cichorium Intybus**, Linn.—Gravelly fields, Castle Dillon, August, 1864. Recorded from the county in 'Cybele,' ed. I., but no locality given.
- Tragopogon pratensis**, Linn.—Lodge Park, June, 1864.
- Jasione montana**, Linn.—Corballis Hill, near Castledermot, 1866.
- ‡**Symphytum officinale**, Linn.—Straffan, June, 1864.
- ***ANCHUSA SEMPERVIRENS**, Linn.—County Kildare, 1864.
- LITHOSPERMUM ARVENSE**, Linn.—Castle Dillon, Straffan, May, 1864.
- ***Linaria minor**, Desf.—Cultivated fields near the railway, Straffan, May, 1864.
- ***MIMULUS LUTEUS**, Linn.—Banks of Liffey, Kildare, June, 1864 (one plant only seen).
- LATHRÆA SQUAMARIA**, Linn.—Sandy woods, Lodge Park, April, 1864.
- ‡**Verbena officinalis**, Linn.—Kilkea, July, 1864.
- Calamintha officinalis**, Moench.—Roadside near Lyons, Sept., 1864. Recorded in 'Cybele,' ed. I., from County Kildare, but no locality given.
- †**Calamintha Aclinos**, Clairv.—Ballytore, 1865.
- Galeopsis Ladanum**, Linn.—Ardrass, August, 1864.
- ***Elodea canadensis**, Michx.—Grand Canal, very abundant, July, 1864.
- Epi-pactis palustris**, Crantz.—Ballyvas Bog, July, 1865 (common in this bog).
- Ophrys apifera**, Huds.—Kilkea bridge, June, 1865. Recorded from the county in 'Cybele,' ed. I., but no locality given.
- POTAMOGETON LUCENS**, Linn.—Grand Canal, July, 1864.
- Potamogeton plantagineus**, Du Croz.—Liffey at Straffan, July, 1864.
- ZANNICHELLIA PALUSTRIS**, Linn.—Ditch, Bayrush, October, 1864.
- Cladium jamalcense**, Crantz.—Ballyvas Bog, July, 1865.
- AGROSTIS CANINA**, Linn.—Bog at Prosperous, July, 1864.
- MELICA UNIFLORA**, Retz.—Woods, Lodge Park, May, 1864.
- Glyceria aquatica**, Sm.—Banks of Liffey, August, 1864.
- TRITICUM CANINUM**, Beauv.—Lodge Park near the Liffey, July, 1864.
- Osmunda regalis**, Linn.—Bog near Gowran, Grange, June, 1864.

NEW PLANTS FROM CO. KILDARE.

BY MISS M. C. KNOWLES.

Several of the following plants were sent to me at the Museum by Master Denis Gwynn. The others were gathered by myself during the summer—

Viola silvestris.—Wood at Clongowes, May, 1904, D. Gwynn.

Diplotaxis muralis.—Railway at Newbridge and Straffan, August, 1904, R. D. O'Brien.

Trifolium hybridum.—Quarry at Celbridge, June, 1904.

Geum intermedium.—Wood at Clongowes, May, 1904, D. Gwynn.

Sedum anglicum.—Walls near Round Tower, Straffan, August, 1904.

Rosa rubiginosa.—Along the canal, Straffan, August, 1904.

Prunus Padus.—One large old tree near a cottage on the road to Clongowes, May, 1904.

Primula veris x acutis.—Field at Clongowes, May, 1904, D. Gwynn.

Salix fragilis.—Liffey at Celbridge, July, 1904.

Botrychium Lunaria.—Dunmurry Hill, May, 1904.

Dublin Museum.

NEWS GLEANINGS.

J. N. Halbert.

Our renewed hearty congratulations to our valued friend and contributor, who, after holding for a few months the post of Technical Assistant in the Dublin Museum, has been promoted to fill the Assistantship vacant by G. H. Carpenter's transfer to the Royal College of Science.

Joseph Pearson.

We congratulate, but with regret at his departure from Ireland, the energetic naturalist of the Larne Marine Station, who has been appointed Lecturer in Zoology at University College, Cardiff.

Thomas Plunkett.

In electing Mr. Thomas Plunkett, of Enniskillen, to the Honorary Membership of the Belfast Club, the members honour themselves as much as they do the recipient of their favour. In the course of a long life, Mr. Plunkett has ever displayed a wide interest in Irish science; and, especially in the matter of cave research, he has backed his interest with plenty of hard work,

Association of Economic Biologists.

The inaugural meeting of this newly-formed Association was held at Burlington House, London, on Tuesday, the 8th November.

Mr. Fred V. Theobald occupied the chair, and, in the course of his introductory remarks, he detailed the steps taken by Mr. Walter E. Collinge to found an Association of Economic Biologists. He hoped that the Association would welcome all investigators in economic biology, whether agricultural, medical, or commercial. The relationship between biology and agriculture was apparent to all, but only recently had we realised the importance of its relationships with medicine and commerce. Membership of the Association would be confined to workers in Economic Biology. All such biologists employed by the Government, or by any county or city council, university, or agricultural or horticultural college or association, and all persons engaged in investigations in economic biology may become members. In addition, others might join the association as associates.

Mr. Collinge announced that about thirty individuals had sent in their names as original members. A draft of the proposed laws of the Association was then read, and, after some minor alterations, was approved, and ordered to be printed.

The following officers were elected for 1904-5:—President, Fred V. Theobald, M.A.; Vice-President, A. E. Shipley, M.A., F.R.S.; Council, Prof. G. S. Boulger, Prof. A. H. R. Buller, D.Sc.; Prof. Geo. H. Carpenter, B.Sc.; Dr. Francis Marshall, Robert Newstead, Major Ronald Ross, F.R.S.; Fraser Storey, Cecil Warburton, M.A.; Hon. Treasurer, Herbert Stone, F.L.S.; Hon. Secretary, Walter E. Collinge, M.Sc.

The next meeting will be held at Birmingham, on April 26th and 27th.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Marabout Stork from Lieut. Stoker, a Roseate Cockatoo from Mrs. Turner, two Frogs and a Green Lizard from Mr. F. Frodman, a pair of Rabbits from Master Sweeney, a Sparrow-hawk from Mr. R. Lambert, and a pair of Herring-gulls from Messrs. Williams. Two Lion-cubs have been born in the Gardens, and a pair of Canadian Beavers are on their way to Dublin from North America. The female Giraffe "Zuleika," has begun the winter in excellent health and condition. She can be well seen behind her glass screen, and she has grown considerably since her arrival in Dublin.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 25.—ANNUAL CONVERSAZIONE.—The winter session of the Club's forty-second year was opened by a conversazione in the Exhibition Hall. The attendance of members and their friends was over 400, while the exhibits were numerous and varied.

Tea was served from seven till eight o'clock. The following is a list of the exhibitors:—

BOTANY.—N. Carrothers, George Donaldson, F. C. Forth, W. A. Green, John Hamilton, Miss Kidd, A. Milligan, H. Lamont Orr, W. H. Phillips, R. Lloyd Praeger, Rev. C. H. Waddell.

ZOOLOGY.—William Allen, John Cottney, Mrs. Foster, N. H. Foster, Rev. George Foster, W. H. Gallway, W. A. Green, Miss Hill, Rev. W. F. Johnson, J. H. MacIlwaine, J. N. Milne, W. S. M'Kee, W. F. M'Kinney, H. L. Orr, Robert Patterson, R. F. Scharff, Rev. C. H. Waddell, R. Welch, A. W. Stelfox, Prof. Gregg Wilson.

GEOLOGY.—Dr. George Abbott, Miss M. K. Andrews, Robert Bell, William Christy, W. J. Fennell, George C. Gough, William Gray, J. Strachan, Joseph Wright.

MISCELLANEOUS.—Miss Andrews, William Gray, Mrs. Hobson, Fraulein Magnussen, W. F. M'Kinney, Robert May, Mrs. Riddel, D. Steel, R. Welch, George Donaldson.

At half-past eight o'clock a short business meeting was held, the President (W. J. Fennell, M.R.I.A.I.) in the chair.

On the conclusion of the President's address, William Gray, M.R.I.A., moved, and W. H. Phillips seconded, that Thomas Plunkett, M.R.I.A., Enniskillen, be elected an honorary member of the Club, which was carried by acclamation, and afterwards sixteen ladies and gentlemen were elected to membership. The remaining business consisted of the presentation of prizes to those members to whom they had been awarded during the year, the recipients being Rev. George Foster, N. H. Foster, Miss Kidd, Miss May Porter, W. J. C. Tomlinson, George Donaldson, and Miss Yvonne Courvoisier (special prize). On the conclusion of the business meeting, the lights were lowered and the lantern display proceeded with, when a large number of interesting views, principally taken on the Club's summer excursions, were projected on the screen, and described by Messrs. Fennell, Green, Hogg, and Welch. Afterwards, the hall having been again lighted up, further opportunity was afforded for examination of the exhibits.

NOVEMBER 15.—The President (W. J. FENNELL, M.R.I.A.I.), submitted his report as delegate to the Committee of Corresponding Societies of the British Association, whose meetings he had attended at Cambridge, August, 1904. WILLIAM GRAY, M.R.I.A., and ROBERT WELCH, spoke to the report.

Afterwards Mr. Fennell proceeded to deliver his Presidential address, the subject of which was the Sligo Conference, a full account of which appeared in this Journal for September,

The lecture was illustrated with 80 specially prepared limelight views.

A letter from Thomas Plunkett, M.R.I.A., Enniskillen, thanking the members for electing him an honorary member of the Club, was read.

The election of three members brought the proceedings to a close.

BOTANICAL SECTION.—NOVEMBER 19.—The opening meeting of the Winter Session was held in the club room, when Rev. C. H. WADDELL, B.D., exhibited and lectured upon an extensive collection of plants made by him in the south of England during the summer of the present year.

DUBLIN NATURALISTS' FIELD CLUB.

OCTOBER 29.—EXCURSION TO TIBRADDEN.—A party of 12 proceeded by car and cycle to the gravel pits just outside the demesne gate of Larch Hill. The conductor, J. De W. Hinch, then pointed out the different features of these deposits, which are among the most interesting of the Dublin high-level drifts. The arctic shells *Astarte borealis* and *Leda pernula* were seen in abundance. The party then crossed the northern spur of Tibradden into Glendoo, where two more gravel pits were visited. After tea at Rockbrook, the members returned to town.

NOVEMBER 1.—The Winter Session was inaugurated by a conversazione held at the Royal Irish Academy (by kind permission of the Council). There was a large attendance of members and visitors. There were also present representatives from other Field Clubs—Robert Patterson and Nevin H. Foster from Belfast, and F. Neale, who represented Limerick. The President, F. W. BURBIDGE, M.A., took the chair at 8.30, and after welcoming the visitors who were present, called upon R. LI. PRAEGER for a lantern display illustrating the Triennial Conference of the Irish Field Club Union held at Sligo in July last, and of which Mr. Praeger had been the organiser and conductor. Afterwards the examination of exhibits was resumed. The conversazione closed at about 10.30 p.m. During the evening a number of scientific exhibits were displayed, including the following—

EXHIBITS ILLUSTRATING THE TRIENNIAL CONFERENCE AT SLIGO:—
G. H. CARPENTER—*Xenylla brevicauda*, from Lough Gill, a Springtail new to the British Isles. **J. N. HALBERT**—Animals from the Sligo District. **Miss M. C. KNOWLES**—Plants collected during the Conference. **Miss M. C. KNOWLES, G. J. FOGERTY, and ALEX. D'EVELYN**—Flint and stone implements from the kitchen-middens at Raghly and Streedagh Point, Co. Sligo. **D. M'ARDLE**—Mosses and Liverworts from Sligo. **ROBERT WELCH**—Photographs and lantern slides illustrating the work of the Conference. **ROBERT WELCH and A. W. STELFOX**—Mollusca of Sligo and District, with map of distribution.

MISCELLANEOUS EXHIBITS:—F. W. BURBIDGE—Odoriferous Plants.

G. H. CARPENTER and J. A. CLARKE—Specimens illustrating the life-history of Common Frog. G. A. J. COLE and T. CROOK—Minerals viewed in convergent polarized light. VERNON G. COLE—Teeth, flint implements, etc., from pre-historic dwellings, sand-dunes, Narin, Co. Donegal. J. DUFFY—Quartz and malachite from Cloghran, Co. Dublin; fossils from Carboniferous Limestone, Lough Gur, Co. Limerick. F. O'B. ELLISON—Quartz minerals from Trinity College Museum. G. P. FARRAN—Copepoda from North-east Atlantic. A. H. FOORD—Specimens from Iceland, illustrating its volcanoes and geysers. Miss A. FRAZER—South African Coleoptera. W. F. GUNN—Fruits of Cone-bearing trees; *Phytoptus ribis* and its effect on currant bushes. J. N. HALBERT—Insect cases from the exhibition collection of Irish animals in the National Museum. J. A. HENDERSON—Irish Lepidoptera and Coleoptera. Professor T. JOHNSON—Fossil woods from the Cromer Forest Bed. STANLEY KEMP—Coleoptera from Co. Limerick. Miss M. C. KNOWLES—Rare plants from Counties Clare and Limerick. Miss MASSY—Some odd-looking fish. A. R. NICHOLS—Nests and specimens of Penduline Titmouse from Cape Colony. G. H. PETHYBRIDGE—Photographs of botanical interest. R. L. PRAEGER—Rare plants from Achill Island and Co. Fermanagh; *Glyceria festucaformis* from new stations. A. ROYCROFT—Glaciated limestone block, St. Doulagh's, Co. Dublin; petrified plants from Ardgillan. R. F. SCHARFF—Photographs and photogravures of Animals in the Dublin Zoological Gardens. HENRY J. SEYMOUR—Geological photographs taken in Counties Kerry and Limerick. VICTOR E. SMYTH—Superimposed stereoscopic pictures. E. WILLIAMS—Mounted specimens of Irish birds. N. H. WILSON—Photographs of Irish birds' nests. R. PATTERSON—Map showing distribution of white and pied birds shot in Ireland. Fraulein MAGNUSSEN.—Sketches of Irish Scenery.

NOVEMBER 19.—WINTER EXCURSION TO BRAY HEAD.—Members and friends to the number of ten turned out for this excursion. The 1.30 train was taken to Bray, from which the Conductor (F. O'B. Ellison, B.A.), led the party round the head by the cliff path. Some good specimens of the much debated *Olhania* were obtained. After tea the party returned to Dublin by the 5.30 train.

NOVEMBER 22.—The first winter business meeting was held in the Royal Irish Academy. C. B. MOFFAT, B.A. (Vice-President), in the chair. R. L. PRAEGER, B.A., B.E., communicated "Additions to Irish Topographical Botany during 1904." This paper will be published in full in the *Irish Naturalist*. The paper was discussed by G. H. Pethybridge, B.Sc. C. A. MATLEY, D.Sc., gave a striking exhibition of lantern slides dealing with geological subjects. These slides were part of the British Association series. The Hon. Sec. read an account of the Club's excursion to Bray Head on Saturday. Mr. E. A. Montmorency Morris, M.A. was elected a member of the Club.

NOTES.

BOTANY.

Chantransia Alariæ in Ireland.

In the *Journal of Botany* for November, Mr. J. Adams records the discovery of *Chantransia Alariæ* at Portrush. This is a northern seaweed, which was described by Jonsson in 1901 from Icelandic specimens, and has since been recorded from the Færoes.

The Vitality of Seeds.

In the November number of the *Irish Naturalist* Mr. Adams draws attention to the fact that there is a great dearth of authentic observations on the time during which seeds can retain their vitality. He also records the appearance of certain weeds in fields where loose soil has been thrown up. The inference drawn from these facts is that the seeds of the newcomers had remained for a long time buried deep in the soil, had retained their vitality, and had germinated when brought up nearer the surface. I cannot think that is the correct explanation. We know that these annuals produce seeds in profusion, and no doubt very many of these seeds are spread by winds, birds, and other agencies over the adjoining or neighbouring grounds. Pasture fields will be, more or less, charged with them. They are there awaiting a chance to germinate and spring up. This opportunity is afforded when the soil is disturbed, and in this way we may account for the phenomenon. It is in fact an immigration, not a resurrection.

S. A. STEWART.

Belfast.

Glyceria festucaeformis at Portaferry.

I found a few tufts of this grass in a new station last July, and Dr. Rendle has kindly confirmed the naming. The locality is close to Portaferry, a wet, rocky bit of shore at the north-western end, where it grows with *G. maritima*. I also saw it in larger quantity further round the coast, at Mr. Praeger's original station at Marlipit Bay. After seeing its habitat so low down on the shore, and considering its wide distribution, I have little doubt it is not a casual, but native on our coast.

C. H. WADDELL.

Saintfield.

ZOOLOGY.**The Red-throated Diver.**

All Irish ornithologists, and especially those who take an interest in our rare breeding species, deplore the wanton cruelty and persecution that is meted out every season to these fine birds—possibly the only pair at present known to breed in Ireland. This year the first clutch of eggs was taken by a native (who was doubtless well rewarded), and sent to Dublin; the exact address can, if necessary, be disclosed later. The birds, thus frustrated in their first attempt, changed the nesting site, and, although the whole country-side was searched, the second nest, I am glad to say, was never discovered. The parent birds were seen during the month of August flying backwards and forwards from the sea, generally with fish, and by the middle of September they had disappeared from the district.

W. C. WRIGHT.

Belfast.

Hairy-armed Bat in Down and Antrim.

At the end of last June Mr. John Cottney sent me a fine male Hairy-armed Bat, captured at Hillsborough. As it was quite uninjured I liberated it at Holywood, after examining it. On the evening of September 10 I saw three bats of this species flying up and down at the "Bank Heads," Larne Harbour, Co. Antrim. These bats do not seem to be quite so rare as has been supposed.

ROBERT PATTERSON.

Glenbank, Holywood.

GEOLOGY.**Greensand Section at Whitehead.**

This fine section, to which I called attention in the February number (p. 49), is now in even better condition for geologists. It is about thirty feet high at the east end, and likely to remain so for some little time. A second section, however, a little nearer the tunnel, may be built up, as the railway company are putting in concrete foundations for some building. Further quantities of the fossiliferous rock from the section have been tipped all along the new siding. A good section of the great basaltic columns in the quarry is now visible

R. WELCH.

Belfast.

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EDITED BY

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DUBLIN MUSEUM.

A Series of Demonstrations or Informal Lectures on various parts of the Collections has been arranged for the coming winter as in previous years.

The following is the Programme so far as it is settled:—

THURSDAYS—ART AND INDUSTRIAL AND BOTANICAL DIVISIONS.

	P.M.		
Dec. 8	4.30	Col. G. T. Plunkett,	ADDITIONS TO THE COLLECTIONS.
" 15	"	Col. G. T. Plunkett,	THE CIRCULATION COLLECTIONS.
" 22	"	Mr Reeves,	ENAMELS.
" 29	"	Mr. Buckley,	FRENCH POTTERY.
Jan. 5	"	Mr. Brennan,	THE CIRCULATION COLLECTION OF LACE.
" 12	"	Mr. Dudley Westropp,	SHEFFIELD PLATE.
" 19	"	Mr. Alabaster,	JAPANESE LACQUER.
" 26	"	Count Plunkett,	THE INNSBRUCK MONUMENT TO MAXIMILIAN.
Feb. 2	"	Prof. Johnson,	A GRAIN OF WHEAT AND ITS DISEASES.
" 9	"	Prof. Johnson,	A PIECE OF TIMBER.

TUESDAYS—NATURAL HISTORY DIVISION.

	P.M.		
Dec. 13	4.30	Mr. Nichols,	LIFE IN THE DEEP SEAS.
" 20	"	Prof. Carpenter,	ELEPHANTS AND THEIR HISTORY.
Jan. 3	"	Mr. Seymour,	THE GEOLOGICAL SURVEY COLLECTIONS.
" 10	"	Prof. Carpenter,	SOME EXTINCT MONSTERS.
" 17	"	Mr. Seymour,	ARRANGEMENT OF GEOLOGICAL COLLECTIONS.
" 24	"	Mr. Halbert,	INSECTS INJURIOUS TO FOREST TREES.
" 31	"	Mr. Ussher	CAVE COLLECTIONS.

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G. T. PLUNKETT, Director.

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 MUSEUM, HULL. TECHNICAL COLLEGE, HUDDERSFIELD

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" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
" " 6	Charlock Spraying.
" " 7	Fluke in Sheep.
" " 8	Timothy Meadows.
" " 9	The Turnip Fly.
" " 10	Wireworms.
" " 11	Prevention of White Scour in Calves (Professor Nocard)
" " 11a	do. do. do.
" " 12	<i>Out of print.</i>
" " 13	Contagious Abortion in Cattle.
" " 14	Prevention of Potato Blight.
" " 15	Fertilizers and Feeding Stuffs Act, 1893, and (Amendment) Regulations, 1904.
" " 16	Sheep Scab.
" " 17	The Use and Purchase of Manures.
" " 18	Swine Fever.
" " 19	Early Potato Growing.
" " 20	Calf Rearing.
" " 21	Diseases of Poultry :—Gapes.
" " 22	Basic Slag.
" " 23	Dishorning Calves.
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" " 25	Fowl Cholera.
" " 26	Winter Fattening of Cattle.
" " 27	Breeding and Feeding of Pigs.
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" " 29	Flax Seed.
" " 30	Poultry Parasites—Fleas, Mites, and Lice.
" " 31	Winter Egg Production.
" " 32	Rearing and Fattening of Turkeys.
" " 33	Profitable Breeds of Poultry.
" " 34	The Revival of Tillage.
" " 35	The Liming of Land.
" " 36	Field Experiments—Barley.
" " 37	" " Meadow Hay.
" " 38	" " Potatoes.
" " 39	" " Mangolds.
" " 40	" " Oats.
" " 41	" " Turnips.
" " 42	Permanent Pasture Grasses.
" " 43	The Rearing and Management of Chickens.
" " 44	" Husk " or " Hoose " in Calves.
" " 45	Ringworm on Cattle.
" " 46	Haymaking.
" " 47	The Black Currant Mite.
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ADDITIONS TO "IRISH TOPOGRAPHICAL BOTANY" IN 1904.

BY R. LLOYD PRAEGER.

[Read before the Dublin Naturalists' Field Club, 22nd November, 1904.]

DURING the year now closed considerable advance has again been made in the working-out of the distribution of Irish plants. For the first time since I began this annual summary, a decrease in the number of new county records has to be chronicled—128 in 1904, against 219 in 1903, and 207 in 1902. In point of interest, however, the 1903 records can vie with those of previous years. The most important botanical event of the year is the publication of Mr. Colgan's *Flora of the County Dublin*, which greatly advances our knowledge not only of the distribution of species in the metropolitan county, but of Irish critical systematic botany. The chief papers of the year on the results of field work refer to the flora of Kerry¹, Dublin², West Mayo³, Sligo⁴, and Fermanagh⁵. The publication by Miss Knowles of the results of Mr. Pugsley's revision of the Fumitories in the Herbarium of the National Museum⁶, is also an important item in the year's work. Of unpublished material, there is a considerably less amount than in the two previous years. The chief contributors of the new records are pretty much the same as last year:—Dr. Scully's additions for North and South Kerry total no less than 31 plants, of which 21 are Brambles; the results of the Field Club Union incursion into Sligo is to add 11 species to the flora of that county; Mr. Colgan's finishing touch to the Dublin

¹ Scully: Notes on the Kerry flora, 1903. *I.N.*, xiii., 77-80; and Some Kerry Rubi. *Ibid.*, 128-130.

² Colgan: Further additions to the flora of County Dublin, . . . *Ibid.*, 56-61.

³ Praeger: The Flora of Achill Island. *Ibid.*, 265-289.

⁴ Praeger: Phanerogamia and Pteridophyta [of Sligo I.F.C.U. Excursion]. *Ibid.*, 204-207.

⁵ Praeger: Among the Fermanagh Hills. *Ibid.*, 232-241.

⁶ Knowles: A List of the Irish Fumitories in the Herbarium of the National Museum, Dublin. *Ibid.*, 33-36.

flora adds 5 species to that division. Mr. O'Brien supplies 9 new plants for Clare and Limerick. My own exploration of Achill Island and of the Fermanagh highlands contributes 12 species to West Mayo and 18 to Fermanagh respectively. Every new record published during the year has made its appearance in this Journal, a fact that much simplifies references in the following pages.

For specimens and notes supplied, I have to offer my best thanks to W. A. Barnes, Miss Beauchamp, Rev. S. A. Brennan, N. Carrothers, N. Colgan, Miss Evelyn Cradock, Mrs. Crichton, Rev. W. W. Flemyng, Mrs. Gibbon, Cuthbert Harrison, Miss Annette Hemphill, Mrs. Frank Joyce, W. F. de V. Kane, Miss Knowles, Mrs. Leebody, H. C. Marshall, Rev. R. M. Miller, S. A. Moore, R. A. Phillips, Wm. Porter, A. Somerville, S. A. Stewart, Rev. C. H. Waddell, W. West.

The records of the year include three plants—all *Rubi*—new to Ireland: namely *R. podophyllus* and *R. serpens* from Kerry, and *R. longithyriger* (var. *botryeros*) from Fermanagh. Four more of Dr. Scully's Kerry Brambles (*R. cariensis*, *R. anglosaxonicus*, *R. regillus*, and *R. Babingtonii*), and three of his Hawkweeds (*H. argenteum*, *H. orimeles*, and *H. sparsifolium*), are new to the South of Ireland. Mr. Pugsley's examination of Irish Fumitories adds Wicklow, Louth, Tyrone and Antrim to the range of *Fumaria purpurea*, which is apparently frequent in Ireland. By my own work in the west, *Rubus cariensis* and *R. dunensis* are extended across Ireland, *Epilobium angustifolium* is pushed southward into Mayo, and *Euphrasia Salisburgensis* northward into Fermanagh. Also, *Ranunculus scoticus* is shown to be common in Achill and on the Fermanagh hills, *Pyrola secunda* to be locally abundant in Fermanagh, and *Glyceria festucaeformis* to extend widely along the shores of Co. Down. Of isolated records, the finding of *Hypopithys multiflora* in Fermanagh, *Sisyrinchium angustifolium* in Sligo, and *Typha angustifolia* in Clare are especially deserving of mention.

A desirable split in a set of existing records comprises the admission of *Matricaria occidentalis*, Greene, to sub-specific rank under *M. discoidea*, DC. This involves a revision of the records of *M. discoidea* in Ireland. As a result, although all the *stations* given in "Irish Top. Bot." cannot at once be

verified, it appears that all the divisions listed under *M. discoidea* aggregate in "Irish Top. Bot." and the annual Supplements, stand also for *M. discoidea* segregate. The distribution of the two forms that can at present be vouched for is as follows: the note of admiration signifies that I have seen specimens. The stations without this sign are vouched for by Messrs. Colgan, Phillips, or Scully.

***M. discoldea*, DC.**

8. Limerick,	Limerick Docks!
10. Tipp. N.,	Nenagh! Dromineer
15. Galway S.E.,	Ballinasloe.
16. Galway W.,	Claddagh.
17. Galway N.E.,	Rockwood! Galway.
18. King's Co.,	Clara!
20. Wicklow,	Greystones!
21. Dublin,	Howth! Carrickmines!
22. Meath,	Ballivor! Kells! Dowth. Rossan.
23. Westmeath,	Mullingar! Athlone!
24. Longford,	Ballywillan!
25. Roscommon,	Carrick-on-Shannon! Athlone!
26. Mayo E.,	Ballaghaderreen! Claremorris! Ballyhaunis.
27. Mayo W.,	Westport! Newport! Clare Island! Achill!
28. Sligo,	Ballymote!
29. Leitrim,	Carrick-on-Shannon!
30. Cavan,	Drumhawnagh!
31. Louth,	Drogheda! Oldbridge!
32. Monaghan,	Monaghan!
37. Armagh,	Between Portadown and Lurgan!

***M. occidentalis*, Greene.**

2. Kerry N.,	Beale Point.
8. Limerick,	Limerick.
21. Dublin,	Hazelhatch. Glenasmole. Lispopple.
22. Meath,	Navan!
28. Sligo,	Ballysadare!

The withdrawals of the year divide themselves into two groups. In the first place, the working out of critical plants in Kerry has involved some revision of nomenclature, and Dr. Scully withdraws from the county *Valeriana Mikanii*, *Hieracium vulgatum*, *H. rigidum*, *H. gothicum*, and *H. boreale*. And in the second place, Mr. Pugsley's revision of the Irish Fumitories involves extensive changes in the published lists:

but as considerable further material is now in Mr. Pugsley's hands, I refrain from going into the latter question at present, and hope to deal fully with the records in this genus in a few months. One other record has to be withdrawn—namely that of *Leucojum æstivum* for Limerick, as the station quoted in 'I. T. B.' belongs to Clare. It is, however, simultaneously restored to the Limerick flora—see p. 29 below.

Regarding *Hieracium diaphanoides*, to which I referred in my summary of additions last year (*I. N.*, xiii., 3), it is satisfactory to be able to report that the original record of this plant as *H. sciaphilum* stands, its reference in part to *H. diaphanoides* and in part to *H. murorum* var. *pellucidum* proving to be founded on insufficient material.

I now give the new county-records of the year, arranged under the respective divisions. The numbers appended to the names give the page of vol. xiii. of the "Irish Naturalist" on which those records which have been published, appear. The occasional roman figures refer to back volumes.

1. KERRY S.—

Rubus suberectus, 128.
plicatus, 128.
nitidus (opacus), 128.
affinis (Briggsianus), 129.
villicaulis (Selmeri and
rhombifolius), 129.
argentatus (robustus), 129.
micans, 129.

Rubus mucronatus, 129.
anglosaxonicus (raduloides),
 130.
regillus, 130.
Babingtonii, 130.
Galium erectum, 78.
Hieracium argenteum, 78.
orimeles, 79.
sparsifolium, 79.

2. KERRY N.—

Rubus cariensis, 129.
micans, 129.
iricus, 129.
pyramidalis, 129.
anglosaxonicus, 130.
regillus, 130.
podophyllus, 130.
fuscus, 130.

Rubus serpens, 130.
corylifolius (sublustris), 13.
Ceanothe Phellandrium, 78.
Galium erectum, 78.
 **Matricaria occidentalis*, xii., 114.
Hieracium orimeles, 79.
sparsifolium, 79.
 **Salix pentandra*, 80.

5. CORK E.—

Fumaria Boræi, 34.

Atriplex littoralis, 118.

7 TIPPERARY S.—

Fumaria Boræi, 34.

8. LIMERICK.

Ranunculus Auricomus.

†Lychnis Githago, 251.

Galium boreale, 251.

*Matricaria occidentalis, 251.

Teucrium Scordium, 251.

†Leucojum æstivum.

Eleocharis acicularis, 251.

Scirpus fluitans.

9. CLARE.—

Cardamine flexuosa.

Cochlearia anglica.

Callitriche stagnalis.

Tragopogon pratensis.

*Mentha rotundifolia.

†Leucojum æstivum.

Allium vineale.

Typha angustifolia, 259.

Luzula vernalis.

Equisetum hyemale.

11. KILKENNY.—

Fumaria Boræi, 34.

12. WEXFORD.—

Hieracium umbellatum.

17. GALWAY N.E.—

Petasites fragrans.

18. KING'S CO.—

Fumaria confusa, 35.

Gnaphalium uliginosum.

†Lactuca muralis, 260.

Convolvulus arvensis.

20. WICKLOW.—

Fumaria purpurea, 36.

21. DUBLIN.—

Rubus plicatus, 297.

Agrimonia odorata, 56.

Galium uliginosum, 56.

*Matricaria occidentalis, iii., 215.

Hieracium murorum, xii., 189,
xiii., 57.

*Salix pentandra, 59.

Carex pallescens, 59.

22. MEATH.—

Fumaria Boræi, 34.

confusa, 35.

Cochlearia danica.

*Matricaria occidentalis.

27. MAYO W.—

Fumaria capreolata, 282.

†Ulex Gallii, 283.

Rubus cariensis, 283.

rhamnifolius, 283.

mucronatus, 283.

dunensis, 283.

Rubus rosaceus (hystrix), 283.

Epilobium angustifolium, 284.

Eryngium maritimum, 279.

*Tanacetum vulgare, 272.

Pyrola media.

Potamogeton pectinatus, 286.

†Glyceria aquatica, 286.

28. SLIGO.

Papaver dubium, 205.

† hybridum, 205.

Lotus uliginosus, 206.

*Sedum album, 206.

Crithmum maritimum, 206.

Æthusa Cynapium, 206.

*Matricaria occidentalis.

Cichorium Intybus, 206.

Chlora perfoliata, 206.

†Linaria vulgaris, 206.

Chenopodium rubrum, 206.

Sisyrinchium angustifolium,
207.Potamogeton heterophyllus
207.

Carex riparia.

Polypodium Phegopteris.

29. LEITRIM.—
 30. CAVAN.—
 31. LOUTH.—
 Fumaria purpurea, 36.
 33. FERMANAGH.—
 Ranunculus scoticus, 238.
 Meconopsis cambrica, 238.
 Rubus pulcherrimus, 238.
 longithyrsiger (botryeros),
 238.
 Sedum Rhodiola, 239.
 Epilobium angustifolium, 239.
 Scandix Pecten-Veneris.
 Lobelia Dortmanna, 239.
 Pyrola media, 239.
 34. DONEGAL E.—
 35. DONEGAL W.—
 36. TYRONE.—
 39. ANTRIM.
- **Matricaria discoidea*.
Fumaria officinalis, 36.
Saxifraga tridactylites.
†*Sedum Telephium*.
Pyrola minor, 239.
Hypopithys multiflora, 259.
Euphrasia Salisburgensis, 240.
Ulmus montana, 240.
Juniperus nana, 240.
Eriophorum latifolium, 240.
Carex dioica, 240.
 paludosa, 241.
Ophioglossum vulgatum 241.
Equisetum pratense. 241.
 trachyodon, 241.
Viola arvensis.
Viola arvensis.
Fumaria purpurea, 36.
Fumaria purpurea, 36.

For convenience, I now re-arrange these plants in systematic order, with the division-numbers appended.

- Ranunculus scoticus*, 33.
 Auricomus, 8.
Papaver dubium, 28.
† *hybridum*, 28.
Meconopsis cambrica, 33.
Fumaria capreolata 27.
 Boræi, 5, 7, 11, 22.
 purpurea, 20, 31, 36, 39.
 confusa, 18, 22.
 officinalis, 30.
Cardamine flexuosa, 9.
Cochlearia danica, 22.
 anglica, 9.
Viola arvensis, 34, 35.
†*Lychnis Githago*, 8.
†*Ulex Gallii*, 27.
Lotus uliginosus, 28.
Rubus suberectus, 1.
 plicatus, 1, 21.
 nitidus, 1 (*opacus*).
 affinis, 1 (*Briggsianus*)
Rubus cariensis, 2, 27.
 ramnifolius, 27.
 pulcherrimus, 33.
 villicaulis, 1 (*Selmeri* and
 rhombifolius).
 argentatus, 1 (*robustus*).
 micans, 1, 2.
 iricus, 2.
 pyramidalis, 2.
 mucronatus, 1, 27.
 anglosaxonicus, 1 (*radu-*
 loides), 2.
 dunensis, 27.
 regillus, 1, 2.
 podophyllus, 2.
 Babingtonii, 1.
 fuscus, 2.
 longithyrsiger, 33 (*botry-*
 eros).
 rosaceus, 27 (*hystrix*).
 serpens, 2.
 corylifolius, 2 (*sublustris*).

- Agrimonia odorata*, 21.
Saxifraga tridactylites, 31.
Sedum Rhodiola, 33.
 * *Telephium*, 31.
 * *album*, 28.
Callitriche stagnalis, 9.
Epilobium angustifolium, 27, 33.
Eryngium maritimum, 27.
Scandix Pecten-Veneris, 33.
Crithmum maritimum, 28.
Oenanthe Phellandrium, 2.
Æthusa Cynapium, 28.
Galium boreale, 8.
 erectum, 1, 2.
 uliginosum, 21.
Gnaphalium uliginosum, 18.
 * *Matricaria discoidea*, 29.
 * *occidentalis*, 2, 8, 21, 22, 28.
 * *Tanacetum vulgare*, 27.
 * *Petasites fragrans*, 17.
 * *Cichorium Intybus*, 28.
Hieracium argenteum, 1.
 orimeles, 1, 2.
 murorum, 21.
 sparsifolium, 1, 2.
 umbellatum, 12.
 † *Lactuca muralis*, 18.
Tragopogon pratensis, 9.
Lobelia Dortmanna, 33.
Pyrola media, 27, 33.
 minor, 33.
Hypopithys multiflora, 33.
Chlora perfoliata, 28.
Convolvulus arvensis, 18.
 † *Linaria vulgaris*, †28.
Euphrasia Salisburgensis, 33.
 * *Mentha rotundifolia*, 9.
Tencrium Scordium, 8.
Chenopodium rubrum, 28.
Atriplex littoralis, 5.
Ulmus montana, 33.
Salix pentandra, *2, *21.
Juniperus nana, 33.
Sisyrinchium angustifolium, 28.
Allium vineale, 9.
 † *Leucojum aestivum*, 8, 9.
Typha angustifolia, 9.
Luzula vernalis, 9.
Potamogeton heterophyllus, 28,
 pectinatus, 27.
Eleocharis acicularis, 8.
Scirpus fluitans, 8.
Eriophorum latifolium, 33.
Carex dioica, 33.
 pallescens, 21.
 paludosa, 33.
 riparia, 28.
 † *Glyceria aquatica*, 27.
Ophioglossum vulgatum, 33.
Polypodium Phegopteris, 28.
Equisetum pratense, 33.
 hyemale, 9.
 trachyodon, 33.

Finally, I append particulars of such of the unpublished notes of the year as refer either to new county records, or to plants previously recorded from only a single county locality. New county records are distinguished by having the name of the division printed in SMALL CAPITALS.

***Ranunculus Auricomus*, L.**

8. LIMERICK. Near Mullough mills, '04—Miss Knowles.

***Nasturtium sylvestre*, R. Br.**

9. CLARE. Tidal mud, Limerick, '01—Miss Armitage!

****Barbarea præcox*, R. Br.**

38. DOWN. Churchtown near Strangford, '02—P.

***Cardamine flexuosa*, With.**

9. CLARE. Parteen, '04—R. D. O'Brien.

Cochlearia danica, L.

22. MEATH. Near Boyne mouth, '04—Barnes!

C. anglica, L.

9. CLARE. Parteen, '04—R. D. O'Brien.

Arenaria trinervia, L.

26. Mayo E. About Castlemagarrett, *Brown Fascic.* 1788—*Cyb.* 2.
This station was erroneously attributed to Mayo W. in *Irish Top. Bot.*

Viola arvensis, Murr.

34. DONEGAL E. Greencastle, '04—Mrs. Leebody!
35. DONEGAL W. Dunfanaghy, '04—D. Gwynn!

Ononis arvensis, L.

18. King's Co. Near Clareen, '04—Miss Hemphill. For *Shinrone* in my 1901 paper read *Sharavogue*.

Saxifraga tridactylites, L.

31. LOUTH. Oldbridge, '04—Barnes!

‡**Sedum Telephium**, L.

31. LOUTH. Dromiskin, long established, '04—Barnes!

Callitriche stagnalis, Scop.

9. CLARE. Glenomera, '04—R. D. O'Brien.

***Myrrhis odorata**, L.

28. Sligo. Near Carrowmore, '04—P.

Scandix Pecten-Veneris, L.

33. FERMANAGH. Portora, '04—W. West.

Gnaphallum uliginosum, L.

18. KING'S CO. Fivealley, '04—Miss Annette Hemphill!

***Matricaria discolorata**, DC.

29. LEITRIM. Carrick-on-Shannon, '99—P

***M. occidentalis**, Greene.

22. MEATH. Navan, '00—P.
28. SLIGO. Ballysadare, '99—P.

***Petasites fragrans**, L.

15. Galway S.E. By railway near Athenry, '04—Mrs Joyce.
17. GALWAY N.E. Two miles north of Tuam—Mrs. Joyce.

Arctium Intermedium, Lange.

28. Sligo. Ballymote, '03—P.

Hieracium umbellatum, L., var. **coronopifolium** (Bernh.).

12. WEXFORD. Sandhills at Gorey, '04 (Mrs. O'Morchoe)—Miss Knowles.

Tragopogon pratensis, L.

9. CLARE. Parteen, '04—R. D. O'Brien.

Pyrola media, Sw.

27. MAYO W. Treenlaur near Westport, '04—Miss Beauchamp!

Convolvulus arvensis, L.

18. KING'S CO. Sand-pit near Birr, '04—Miss Hemphill!

***Mentha rotundifolia**, L.

9. CLARE. Edenvale, '04—R. D. O'Brien and G. Fogerty.

Betula verrucosa, Ehrh.

8. Limerick. White River near Foynes, '04—Miss Knowles.

Habenaria chloroleuca, Ridley.

8. LIMERICK. Thornfields, '01—Miss Armitage. This note omitted in my paper on Additions in 1902.

‡**Leucojum aestivum**, L.

8. LIMERICK. Above the railway bridge over the Shannon, '04—R. D. O'Brien. Below Adare rectory, '04—Canon O'Brien.
9. CLARE. Parteen, '00 (R. D. O'Brien)—*I.T.B.* In that work erroneously placed under Co. Limerick.

Allium vineale, L.

9. CLARE. By River Shannon above Limerick, '04—R. D. O'Brien.

A. ursinum, L.

10. Tipperary N. Birr, '04—Miss Hemphill.

Lemna polyrrhiza, L.

17. Galway N.E. Lydecan, '04—Mrs. Joyce.

Potamogeton praelongus, Wulf.

40. Londonderry. Port Lough, '02—Mrs. Leebody !

Cladum Mariscus, R. Br.

31. Louth. Drumcah Lough near Iniskeen, '04—P.

Luzula vernalis, DC.

9. CLARE. Parteen, '04—R. D. O'Brien.

Scirpus fluitans, L.

8. LIMERICK. Rock Hall near Loughil, '04—Miss Knowles.

Carex muricata, L.

20. Wicklow. By the cliff-path on Bray Head, '04—P.

C. rigida, Good.

16. Galway W. Lake on Ben Coona, '32 (*Herb. Shuttleworth*)—*Herb. S. & A. M.*

C. paludosa, Good.

25. Roscommon. Kiltewan, '98 (*Mapother*)—*Herb. S. & A. M.*

C. riparia, Curt.

28. SLIGO. Between Sligo and Knocknarea, '04—P.

Agrostis alba, L.

25. ROSCOMMON. Kiltewan, '97 (*T. A. Mapother*)—*Herb. S. & A. M.* This note omitted in my 1901 paper.

Melica uniflora, Retz.

25. ROSCOMMON. Near Rockwood House, '99—P. This note omitted in my 1901 paper.

Bromus erectus, Huds.

15. Galway S.E. Moyode, '99—P.

Polypodium Phegopteris, L.

28. SLIGO. Mountain west of Collooney—Mrs. Crichton !

Ophloglossum vulgatum, L.

33. Fermanagh. Inishmore Hall, Lisbellaw, '04—N. Carrothers.

Equisetum hyemale, L.

9. CLARE. Parteen, '04—R. D. O'Brien.

COLEOPTERA AT LOUGH NEAGH AND AT
PORTRUSH.

BY PROF. T. HUDSON BEARE, F.E.S.

I SPENT a portion of my Easter holidays in the north of Ireland in 1904, crossing over from Stranraer to Larne on the morning of Wednesday, April 20th, and returning home by the same route on Tuesday, April 26th. The weather was mild, but very stormy, and on Sunday, the 24th, a perfect hurricane blew at Portrush all day; vegetation was on the whole more advanced than it had been at Dumfries, where I spent a few days prior to crossing over.

On the afternoon of Wednesday, the 20th, I had a hurried run out to Antrim, and obtained permission to walk through the grounds of Antrim Castle; on the shore of Lough Neagh I found *Pelophila borealis*, Pk., fairly common under stones on the flat muddy beach, and with it *Elaphrus riparius*, L., and *Anchomenus marginatus*, L., in abundance, and *Bembidium lampros*, Hbst. I only had about half an hour at my disposal owing to the necessity of catching the train back to Belfast.

On the 21st, we went out by train to Lurgan, and drove from there by car to Ardmore Point on Lough Neagh; in spite of the strong wind, it was a fine spring day. On the shores of the lough, under weeds thrown up by the waves, the following were taken:—*Pelophila borealis*, Pk., again fairly common; *Anchomenus marginatus*, L., *A. parumpunctatus*, F., *Bembidium littorale*, Ol., *B. bipunctatum*, L., and one specimen of *Silpha dispar*, Hbst.

The morning of Friday, the 22nd, was spent in the journey to Portrush, and as the afternoon was wet, collecting was not possible. The greater part of Saturday was devoted to a drive to the Giant's Causeway, and a long walk to the more interesting parts of that piece of grand coast scenery; the Causeway has been so often described that no words of mine are needed in its praise. I will only say that we saw it under the most favourable weather conditions, and the reality far exceeded our expectations. On our return, I had a ramble over the sandhills, on the sea edge of the golf course, and saw or took

the following beetles :—*Brosicus cephalotes*, L., *Aphodius scybaliarius*, F., *Aphodius prodromus*, Brahm., *A. fimetarius*, L., *Ægialia arenaria*, F., *Otiorhynchus atroapterus*, De G., *Philopodon geminatus*, F., and *Heterocerus flexuosus*, Steph.

On Sunday, the 24th, I walked along the coast road to Bushmills, and then inland some three or four miles to a large peat bog, in the hope of coming across *Carabus clathratus*, L., but in this I was disappointed, and the furious wind made collecting almost an impossibility; the only beetles secured at the bog itself were *Olisthopus rotundatus*, Pk., and *Lochmæa suturalis*, Th. Under stones by the road-side on the way to Bushmills I found *Megacronus analis*, Pk., *Silpha subrotundata*, Steph., *Staphylinus erythropterus*, L., and *Otiorrhynchus sulcatus*, F.; on the return walk, all my energies and bodily strength were needed to cope with the fury of the gale, so, needless to say, I attempted no collecting.

Monday, the 25th, was still stormy, but as it was my last day, I determined to do as much as possible, and walked inland a little to get shelter from the wind; the following species occurred under stones by the road-side, and in a narrow lane, which would evidently have been a fine collecting ground two months later on in the season :—*Chrysomela Banksi*, F., *Silpha subrotundata*, Steph., *Pterostichus striola*, F., *P. versicolor*, Stm., *P. niger*, Schal., *P. strenuus*, Pz., *P. vernalis*, Pz., *Carabus granulatus*, L. (two of these were very small examples), *C. nemoralis*, Müll., *Cychnus rostratus*, L., *Stomis pumicatus*, Pz., *Quedius tristis*, Gr., and *Anchomenus parumpunctatus*, F.

The only possible way of collecting beetles in such a locality so early in the season was by turning stones, and by shaking moss, and consequently nearly all the captures belong to the *Carabidæ* or *Staphylinidæ*, and the time at my disposal was insufficient to allow me to do more than sample the coleopterous fauna of the localities I visited; the fact, however, was quite clear that beetles were far more abundant than they had been in the Dumfries district, where I had been collecting more eagerly than in Ireland. In that district one could turn over dozens of stones without seeing a sign of beetle life, while at Portrush under every stone I examined beetles were to be found, and often specimens of two or three species under a single stone. My brief visit convinced me that under more

favourable weather conditions, and a little later in the year, the Portrush district would return a rich harvest to any coleopterist who worked it. It is a district easily reached from both Scotland and England; there is a long stretch of some of the most beautiful coast scenery in the United Kingdom, and an exceedingly comfortable hotel (under the control of the Railway Company), with grand views from its windows; it is an ideal spot for any coleopterist from the adjoining island of Great Britain to spend his holidays in, and to acquire some knowledge of Irish beetle fauna.

The University, Edinburgh.

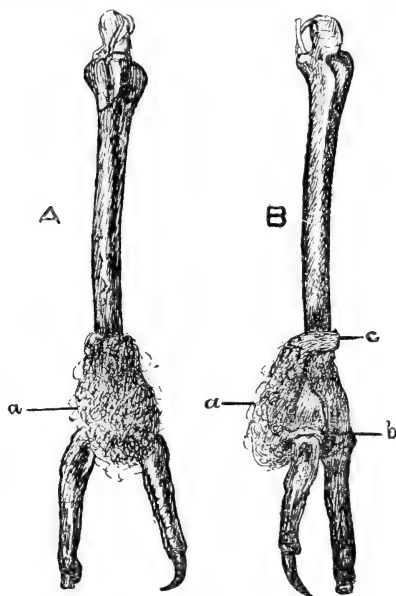
A PECULIAR CASE OF NECROSIS IN A LAPWING'S FOOT.

BY A. R. NICHOLS, M.A.

IN November last Mr. W. Hande sent to the Dublin Museum the leg of a Lapwing, with the middle toe missing and with the base of the toes entwined with sheep-wool, the birds having been shot at Teer, near Crossmaglen, Co. Armagh, on the last day of the preceding month.

The loss of the toe had apparently been due to necrosis of the toe, caused by the wool having become tightly wound round its base. The wool can be seen entwined round the inner toe at *b* in figure *B*, and would probably in time have caused also the loss of this toe; it is also wound round the lower end of the leg at *c* in figure *B*, but not tightly. Similar cases of necrosis would appear to be not very uncommon, for on the specimen being shown to Dr. Bowdler Sharpe at the British Museum, he forwarded the 'Bulletin of the British Ornithologists' Club' for November, 1904, containing an account of the meeting on the 19th October, at which were exhibited a series of legs of the Lapwing, showing various stages of necrosis of the lower part of the leg, caused by sheep-wool having become wound round the part affected.

It has been suggested that the toe had been lost by an accident, and that the bird had intentionally wound the wool round the base of the toe to serve as a kind of bandage. But, although birds have been credited with sufficient intelligence to dress a wound or a broken limb (Mr. L. H. de Visme Shaw, in "Snipe and Woodcock,"¹ gives an extract from the report of a lecture delivered by Professor Victor Fatio before the Geneva Physiological and Natural History



INJURED LAPWING'S FOOT.

A. Front view

B. Side view.

a, b, c Sheep-wool.

Society, in which he mentions several cases that he had noticed of the Woodcock, when wounded, managing to make for itself an ingenious dressing of feathers), this explanation of the presence of the wool must be rejected in favour of the simpler one of it having become accidentally entwined.

¹ Fur, Feather, and Fin Series, London, 1903.

THE OCCURRENCE OF YEW IN A PEAT BOG IN QUEEN'S COUNTY.

BY J. ADAMS, M.A.

PLATE I.

THAT the Yew must have been widely distributed in former times over Ireland is evident from the large number of Irish names containing the termination *ure*, or a modification of it. And yet there are very few reliable records of its being found in the peat bogs scattered over the country. At the end of 1903 my attention was directed by Mr. R. D. Cole to its occurrence in Ballyfin Bog, Queen's Co. Mr. Cole informs me that it was so plentiful in former times that the farmers in the neighbourhood used it for gate posts, house roofs, &c. He very kindly obtained specimens of the wood, of which Plate 1 (*A*) is a photograph of a trunk which had been lying prostrate, and, after being sawn through close to the roots, was raised into the vertical position to be photographed. Plate 1 (*B*) is a photograph of a cross section of the trunk. This cross section shows no less than 395 annual rings. Possibly a few annual rings on the outside had decayed, although in places the bark was still attached, so that the age of the tree was somewhere about 400 years. The shape of the section, as shown in the photograph, was peculiar, one diameter being much longer than that at right angles to it. The longer diameter was $23\frac{9}{16}$ inches, or, assuming that a few rings were missing on the outside, about 2 feet. The annual rings varied greatly in breadth, the broadest being 3 mm. ($\frac{3}{25}$ of an inch), while 74 of the narrowest measured 7 mm. ($\frac{7}{8}$ of an inch), or an average width of $\frac{1}{264}$ of an inch for each ring. Another specimen was remarkable in that it showed 123 annual rings occupying a width of 39 mm. ($1\frac{9}{16}$ of an inch).

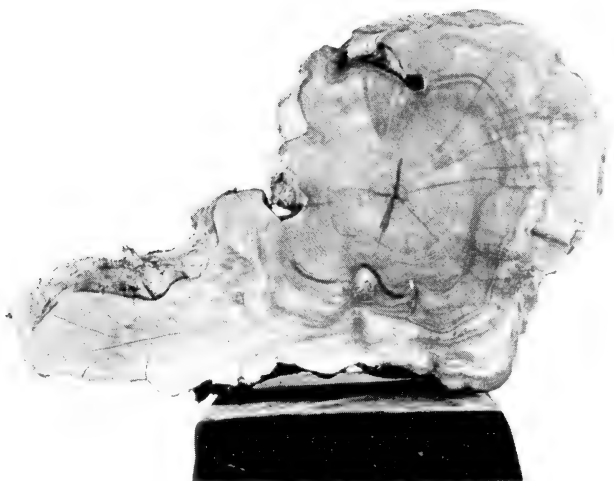
The wood is undoubtedly Yew, as it consists entirely of tracheids with bordered pits and spiral thickenings, and is devoid of resin passages. Mr. Cole has presented a section similar to that in the photograph to the National Museum.

Royal College of Science, Dublin.

A



B



A. YEW TRUNK FROM BALLYFIN BOG, QUEEN'S CO.

R. D. Cole, Photo.

B. TRANSVERSE SECTION OF TRUNK,

T. Price, Photo.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Cream Bull from H.M. the King, a Badger from Major J. W. Blackwood Price, a Banded Parrakeet from Lady Constance Butler, and four Rabbits from Mr. Crowe. Mr. T. Smith, of Newry, has kindly given a hundred evergreen plants, to be placed among the hawthorn bushes on the far side of the lake. A young Seal, caught by fishermen at Bray, has been acquired for the gardens, and placed in the pond already inhabited by the well-known Sea-lion.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 17.—The Club met at Leinster House.

Dr. SCHARFF showed a microscopic preparation of *Ctenodrilus parvulus*, Scharff, and explained the general structure of this primitive marine worm, and its peculiar mode of fissiparous reproduction.

W. F. GUNN showed carpellary hairs from the fruit of the common Dog-rose, *Rosa canina*. Mounted in Canada balsam, and viewed under polarized light, they provide an extremely beautiful object.

D. M'ARDLE exhibited *Ulota phyllantha*, Brid, a very interesting moss, which he collected last July on rocks at Raghley, Co. Sligo. It is more frequently found on trees, and grows in neat clusters on the stem, and often at the tips of the branches. It is rarely seen in fruit; it has been reported that a few capsules were once found on Killarney specimens. How then are we to account for its wide distribution? It is found near sea level, and at high elevations in Ireland, as at Glencar, &c., higher still on the Northumberland coast, and at the highest limit of vegetation on Chimborazo, in S. America. In the absence of spores reproduction takes place by adventitious budding; articulated gemmæ are produced near the apex of the leaves, especially the upper ones (these were shown under the microscope), when fully formed they drop off and, under favourable circumstances, produce protonema, from which new plants grow; these may possibly bear fruit, and shed their spores, and so complete a second cycle in the life history.

J. N. HALBERT exhibited a water-mite, *Arrhenurus ornatus*, George, found in pools at Toome, Co. Antrim, and in the river Corrib, near Galway. The species was first described a few years ago (*Science Gossip*, vol. vii., n.s. 1900, p. 204) from specimens found in England. Although a distinct and easily recognised species it has not been discovered in any locality out of the British Isles.

BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 20.—The second meeting of the winter session was held in the Museum, College-square, North, when there was a large attendance of members and friends. Previous to the meeting the usual "Science gossip half-hour" was occupied for informal discussion by members, when a white Water Rail, recently shot in Co. Down, was exhibited by Mr. Robert Patterson, and sample of Rhætic bone beds of Aust, Bristol, by Mr. Robert Bell.

The President (W. J. FENNELL, M.R.I.A.I.), in the chair. Rev. GEORGE FOSTER read a paper entitled "A Talk about Moths: the Life History of a Poplar Hawk-Moth. as told by herself." The Poplar Hawk-moth, and other moths born and bred on willow or poplar trees, and reared by the writer, were exhibited. The paper was spoken to by JOHN HAMILTON.

A paper, entitled "The Feathered World," was read by NEVIN H. FOSTER, M.B.O.U., who, after dealing with the age of birds as evidenced by fossils, gave a description of the structure, development, and uses of feathers, and went on to describe the two divisions of modern birds, *Ratite* and *Carinata*, in some detail. Several of the more remarkable forms of foreign birds were exhibited on the screen, and attention directed to their peculiar forms and habits, after which a large series of British birds and their nests was shown. Mr. Foster concluded his paper by an appeal to those present to protect our birds, while at the same time the study of birds in their native habitats was recommended, the only weapon necessary for this purpose being a good field-glass.

The paper was discussed by ROBERT PATTERSON, F.Z.S., ROBERT WELCH, and the President. Two new members were elected.

BOTANICAL SECTION. DECEMBER 17.—WM. GRAY, M.R.I.A., exhibited a very fine series of microscopic slides, illustrating mainly the structure of plant tissues.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 10.—Winter Excursion to Trinity College Botanic Gardens. In spite of the extreme coldness of the day thirty-eight members and friends passed a very pleasant afternoon under the conductorship of the Curator of the gardens, F. W. Burbidge, M.A. (President D.N.F.C.) The party visited all parts of the gardens, the exotic plants in the hot-houses attracting great attention.

DECEMBER 13.—The second business meeting was held in the Royal Irish Academy House, W. F. de V. KANE, D.L., in the chair. Announcements with reference to the Annual General Meeting of the Club in January were made. F. O'B. ELLISON, B.A. (Hon. Sec.), read an elaborate paper on "Symbiosis," drawing illustrations in support of the theory from both the animal and vegetable kingdoms. The paper was discussed by J. A. CLARKE and the Chairman.

**BELFAST NATURAL HISTORY AND PHILOSOPHICAL
SOCIETY.**

DECEMBER 19.—A paper was read by JAMES TAYLOR on "Stained Glass, Ancient and Modern."

JANUARY 3.—The Lord Mayor (Sir OTTO JAFFE) in the chair. HARTLEY T. FERRAR, B.A., F.G.S., lectured on "Some Results of the National Antarctic Expedition."

REVIEWS.**A ZOOLOGICAL BY-PATH.**

Superstitions about Animals. By FRANK GIBSON. Pp. 208.
London and Newcastle-on-Tyne: The Walter Scott Publishing
Co. 1904. Price, 3s. 6d.

In this bright and readable little volume the author has brought together a large store of information on a fascinating subject. At the opening of the book he deals with the numerous instances of particular animals being regarded as omens of either good or bad fortune. Then we are led to a discussion of the best-known popular fallacies about common animals and their habits. Finally, there is a chapter on imaginary animals. The subject-matter of the book, therefore, includes such superstitions as the belief in the Raven or Crow as a harbinger of ill-luck; the sailors' fancy that Sharks follow a ship on which a death is shortly to take place; the supposed goat-sucking habits of the Night-jar and the hibernation of Swallows, and the nature of the Basilisk and the Phoenix. The various legends mentioned are illustrated with many striking stories and appropriate quotations from the poets.

Among superstitions about animals familiar to us in Ireland, the Wren-hunting on St. Stephen's Day—practised also in the Isle of Man—is described at some length, and explained as a survival of the enmity on the part of early Christian teachers towards a bird venerated by the Druids. The folk-lore of the "Devil's coach-horse" and of the Elephant Hawk-moth caterpillar are not mentioned, however. Indeed, throughout the volume, invertebrates are hardly recognised at all.

As a scientific contribution to the subject the book is rather disappointing. The author has collected many facts, but his comments are, for the most part, confined to moralisings on the foolishness of the beliefs which he records. Perhaps the survival of superstition amongst us—even in the twentieth century—may call for some such corrective as this. But these strange fancies have causes, and a comparison of the forms which they assume among our own and allied races of men could not fail to be a valuable contribution towards the history of human thought.

G. H. C.

RECREATIONS OF A LIGHTKEEPER.

Notes on the Natural History of the Bell Rock. By J. M. CAMPBELL. With an Introduction by JAMES MURDOCH. Edinburgh: David Douglas, 1904. Pp. xv. + 112. Price, 3s. 6d. net.

The author of this pleasant little book has been for nine years assistant at the famous Bell Rock lighthouse, off the east coast of Scotland. During this time he has made good use of his opportunities in observing the animals haunting the reef, and a few glances at the volume show us that he has recorded his observations vividly, and not without literary skill. All the world knows in how many ways we are indebted to the brave men who spend so much of their lives on these lonely rocks. The recently-published work on bird-migration, both in Scotland and Ireland, had been impossible without the lighthouse keepers' willing help. Naturalists will gladly welcome, therefore, this modest but valuable contribution to the zoology of the sea.

NOTES.

BOTANY.

A rare Alga in the Upper Bann.

Cladophora (*Conserva*) *agagropila* is thus noted in *Flora Hibernica*, Part III., p. 228 (1836):—"In lakes, very rare. Connemara; J. T. Mackay," and I have no information of there being any subsequent Irish record. Its occurrence, therefore, in the rocky bed of the River Bann at Knocknagor, Co. Down, where it was noticed in July last, may have some interest. It grows in large, flat, smooth patches, only the tips of the densely compacted, olive-green branches appearing above the fine, sandy deposit in which it is embedded. The usual habitat seems to be moorland lakes, and nowhere, perhaps, is it often seen *in situ*, but, when fully developed, it becomes detached and rises to the surface in globose masses, varying in size up to four inches in diameter. I have to thank Canon Lett and Mr. William West for their kindness in examining specimens submitted to them, and for information which they have obligingly supplied.

J. H. DAVIES.

Lenaderg, Co. Down.

Sligo Ferns.

I see by the September issue that *Hymenophyllum unilaterale* is recorded among the list of interesting plants found during the Field Club visit to Sligo. It may be of interest to record that some two or three years ago I found both *H. unilaterale* and *H. tunbridgense* in the habitat given by

Mrs. Leebody, viz.--hill behind Doonee Rock. The enclosed frond of Welsh Polypody was taken from a plant found on the shore of Lough Gill near Doonee Rock. I have also found it and the Irish Polypody on Goat Island, Lough Gill.

CUTHBERT HARRISON.

Ballincar, Sligo

Mr. Harrison encloses specimens of *H. unilaterale* and *H. tunbridgense*, and also a frond of true *Polypodium vulgare*, var. *cambricum*, L. This beautiful form of the Common Polypody has a historic interest, as having been described as a good species, *Polypodium cambricum*, by Linnæus. It is, moreover, extremely rare in Ireland. The only reliable record that I know is Co. Wicklow; a root originally from there was sent to Edward Newman by David Moore (Newman: History of British Ferns, 1844, p. 46). Newman was acquainted with the plant, having examined the Linnean type, which he figures (p. 45), alongside the more common var. *semilacerum* (= *hibernicum*) with which var. *cambricum* has often been confused. Newman's figure of var. *semilacerum* (as found in the Dargle by J. T. Mackay), which he places beside that of *cambricum*, shows well the characters of the two. *Cambricum* is the true plumose form of the species, and is barren; *semilacerum* is a robust fertile decomposite form.

R. LLOYD PRAEGER.

Dublin.

Abnormal Growth of Polypody.

Two botanical text books, viz., Hooker's *Student's Flora*, and Bentham's *Handbook of the British Flora*, give the measurements of Polypody (*Polypodium vulgare*) as about six inches to a foot in length. A short time since I found a couple of fronds measuring respectively 2 feet $3\frac{1}{2}$ inches, and 2 feet $\frac{3}{4}$ inches in length, growing on the top of a wall near Portlaw.

WILLIAM W. FLEMING.

Portlaw.

The Vitality of Seeds.

I read with intense interest and pleasure the excellent and informing contribution of Mr. J. Adams, M.A., on this subject in the November issue of the *Irish Naturalist*, and commented upon it at some length in the *Irish Educational Journal*, of which I am Natural History Editor. My object in now writing, however, is for the purpose of stating that I do not agree with the statements of Mr. S. A. Stewart in the December issue as to seeds which have remained for a long time buried deep in the soil not retaining their vitality, nor germinating when brought up to, or near, the surface. I entirely agree with Mr. Adams that this is not only possible but extremely probable, and am able to back my opinion by some rather interesting observations. Many of the botanical readers of the *Irish Naturalist* will know by repute—if not by experience—of the

fame of that interesting corner of rural England known as Poppyland, in the neighbourhood of Cromer, Norfolk. The late Clement Scott did much to immortalise the place in his "Garden of Sleep," and christened it "Poppyland."

I visited the district in July, 1904, and had several instances brought to my notice of the manner in which the seed of the Scarlet Poppy (*Papaver Rhæas*, Linn.) lies buried beneath the soil for some time and yet retains its vitality. There are not so many Poppies in this far-famed corner of rural England as formerly, and this is stated on good authority to be due to the fact that when steam ploughs were used a deeper furrow was turned up, with the result that a mass of Poppies sprung up as if by magic! So much so indeed, that these ploughs had to be discarded and hand-ploughs resorted to again, with the result that the mass of Poppies disappeared, and the tiller of the soil was pleased that he had, as a consequence of the change of plough, succeeded in—to a great extent—eradicating one of nature's pests to agriculture. These observations clearly prove to my mind that Scarlet Poppy seed lies buried very deeply in the soil at and near Cromer, and also retains its vitality, germinating, if only it is afforded the opportunity of so doing, by being brought to the surface of the ground.

Further, wherever building operations are carried out near Cromer, the soil thrown up from the foundations results in a mass of Scarlet Poppies propagating themselves. I saw several gardens of recently erected houses which were in July one dense mass of bright scarlet, where previously not a single blossom was to be seen!

Since writing the foregoing I observe that Dr. E. Strasburger and his co-authors in "A Text Book of Botany" (page 294) state that "the germination of seeds, once securely lodged in the soil, may begin immediately or after a longer or shorter period of rest. The seeds of many Conifers do not germinate for several years. Some plants again, in addition to seeds which germinate in the first year, produce others which require a longer rest (*Trifolium pratense*, *Robinia Pseudacacia*, *Cytisus Laburnum*, *Reseda lutea*, &c.) Even under favourable circumstances such seeds do not germinate until a definite length of time has elapsed. Germination may be delayed also by external conditions, and the vitality of the seed may still be retained for years. Thus, for example, on the removal of a forest from land that had been under cultivation for forty-six years, Peter found that a great variety of field plants at once sprang up as soon as the requirements for their germination were restored."

W. PERCIVAL WESTELL.

St. Alban's, Herts, England.

In the year 1903 I had occasion to cut out a new walk through land that has been under grass certainly not less than forty years. I used the turf to make embankments, sodding most of it, but leaving a margin bare to grow flowers in. The remainder of the earth removed was heaped

where it now lies. In 1904 Mullein came up in quantity, both in the flower border and in the heap of spoil. It is not land where Mullein would grow wild, but the plant is used in this country as a remedy in consumptive cases, and it may have been cultivated long ago in some garden on this spot. Fumitory and *Polygonum Convolvulus* made their appearance in the cut edges of the walk. Some years ago when I was building on this field I removed the active soil from the site of the house, and it lay where it was piled for about eighteen months. I was surprised at the number of plants quite foreign to the pasture that came up, and regret that I did not make a note of them. There was Fumitory in several forms, an *Atriplex* or *Chenopodium*, I am not sure which, in great quantity—*Polygonum aviculare*, the Red Pimpernel, and many other plants that I cannot now be sure of. I would direct attention to the very interesting speculations and experiments recorded in "More Letters of Charles Darwin," particularly those with seeds of supposed geologic date, where he seems to have too easily accepted a negative conclusion.

R. D. O'BRIEN.

Parteenalax, Limerick.

ZOOLOGY.

Irish Marine Worms.

In his "Notes from the Gatty Marine Laboratory, No. 26" (*Ann. and Mag. Nat. Hist.* (7.), vol. xv., 1905), Prof. McIntosh refers to the occurrence of the following species off the coast of Ireland:—*Glycinde Nordmanni* Malny, *Glycera unicornis*, Savigny, *Glycera lapidum*, Quatref., and *Glycera alba*, H. Rathke.

Irish Woodlice and Marine Isopoda.

In the *Irish Naturalist* of October, 1903, Dr. Norman's supplemental list of British Land Isopods has already been referred to. He now gives us a second supplemental list (*Ann. and Mag. Nat. Hist.*, vol. xlv. (7th S.) 1904), in which he mentions that *Armadillidium pulchellum*, which was discovered at Ballymote, Co. Sligo, by Scharff in 1901, has now been taken by Dr. Brady at Araside, in Westmoreland. Of the other new British species alluded to by Dr. Norman, both *Trichoniscus albidus* and *Porcellio rathkei* will probably be found in Ireland also.

A second paper of Dr. Norman's deals with some of the marine allies of our woodlice. The Irish species mentioned are *Circolana borealis*, *Eurydice pulchra*, *Idotea balthica*, *I. granulosa*, *I. pelagica*, *I. metallica*, *I. emarginata*, *Astacilla longicornis* and *A. intermedia*.

Tame Dragon-flies.

The following account of the intelligence of two Dragon-flies, *Diplax striolata*, may interest some of the readers of the *Irish Naturalist*. They were taken in August last, by my little daughter, aged ten, and kept by her in a large glass jar which she divided into two parts, separated by a piece of tile about $2\frac{1}{2}$ inches high. The larger space she filled with earth, in which she planted Short Sedge, and placed water in the other space to make the surroundings as natural as possible. Here her pets lived, and after feeding them regularly for some days, with gnats from her fingers, they became quite tame, and when released from the jar in the open air, would fly round and round her, lighting again somewhere near, frequently on herself, and seemed quite contented to be replaced in the jar.

It was most curious and interesting to watch these usually shy insects greedily devouring the gnats which their little mistress caught for them each day with her net.

J. H. JOHNSTON.

Park Cottage, Wexford.

Great Shearwaters and Sooty Shearwaters in 1901.

In the *Field* of 12th October, 1901, Mr. H. Becher announced that he had shot four of each of these little-known species, of which he kindly presented two Great and two Sooty Shearwaters to the Dublin Museum. Examples of both species are stated to have been exhibited by Mr. E. Williams at the conversazione of the Dublin Naturalists' Field Club on 5th November, 1901, but this is the only notice of their occurrence that I can find in the *Irish Naturalist* (vol. x., p. 253). I, therefore, give some particulars from letters of Mr. Becher:—

On 9th September, 1901, that gentleman passed, in his yacht "Zulu," between Cape Clear and Mizen Head, ten or twelve Sooty Shearwaters, but did not get a shot at them. There were numbers of Great Shearwaters also seen, and Mr. Becher sailed into a flock of these which he estimated at 200 or 300 birds. He shot four Great Shearwaters that day; and on the 13th September, when a few miles off Valentia, he sailed into a large flock of both species, and shot four Sooty Shearwaters. He adds that there were great numbers of both sorts on the latter date between the Blaskets and the Skelligs.

I had an opportunity of examining in the Dublin Museum the four bodies. One was of a female, and the others appeared to belong to male birds, but the organs of reproduction were inconspicuous, so that it was plainly not the breeding-season of these creatures. A third specimen in the Dublin Museum was obtained off Achill Island on 22nd May, 1901.

The observations of Mr. Becher in 1892, 1899, 1900, and 1901, go to show that both these oceanic species may be met with in August and September off the south-west extremity of Ireland, and sometimes in considerable numbers,

R. J. USSHER

Cappagh, Co. Waterford.

Little Auk at Portmarnock.

On 27th November a live specimen of the Little Auk (*Mergulus alle*, L.) was picked up in a field at Portmarnock. It was in a very exhausted condition, and had evidently been a long time without food. This makes, as far as I am aware, the sixth occurrence for Co. Dublin; Mr. Ussher, in his "Birds of Ireland," records five.

J. TRUMBULL.

Malahide.

A White Water-Rail.

On 9th November, 1904, I was given a perfectly white Water-Rail (*Rallus aquaticus*), which had been shot the same day near Seaforde, Co. Down, by Mr. Herbert M'Cammon. It was a most beautiful specimen, being pure white in every part except the first primary of one wing, which had a faint cloudy dark stain about the size of a sixpence. The feet and legs were a very pale pinky-orange, but the bill was the usual red colour. The bird was in splendid condition, was of large size, and weighed 5½ ounces. The only previous Irish record of a similar Water-Rail that I know of is that of Williams & Son (*Zoologist*, 1882, p. 74), but a mottled one was shot near Newry, Co. Down, on 9th January, 1899, and was preserved by Sheals.

ROBERT PATTERSON.

Holywood, Co. Down.

NEWS GLEANINGS.

Prof. Charles J. Patten, M.D., D.Sc.

Our hearty congratulations to our contributor, Prof. C. J. Patten, of Sheffield, on whom the University of Dublin has conferred the degree of Doctor of Science, in recognition of his researches in anatomy and zoology.

Miss Jane Stephens, B.Sc.

We are glad to announce the appointment of this talented zoologist as Technical Assistant in the Dublin Museum. Miss Stephens has been doing excellent temporary work for the past year in the collections of marine invertebrates, and her accession to the post vacated by J. N. Halbert on his promotion will greatly strengthen the Museum staff.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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JOSEPH PATRICK O'REILLY.

BORN 11TH JULY, 1829. DIED 6TH JANUARY, 1905.

THE death of Prof. J. P. O'Reilly removes one of the last links between the present generation and the active group of Irishmen who were associated in the development of the Royal College of Science some forty years ago. Had that college remained under local influences, as part of the great work inaugurated by the Royal Dublin Society in the previous century, it cannot be doubted that the spirit of O'Reilly and his colleagues would have been earlier felt in Irish education. As it was, they left a small but devoted band of pupils, many of whom were driven, by the general apathy towards scientific studies, to seek work outside the country of their birth. Fortunately, O'Reilly was spared to see the revival of such studies throughout Ireland, a revival that he would always have wished to associate with the progress of general culture, side by side with technical advancement.

He was one of a family of thirteen, being the fifth son of Thomas O'Reilly (known in his profession as 'Thomas Reilly'), a solicitor of Monaghan. His mother's maiden name was Cecilia Devin. He was born in Monaghan on 11th July, 1829, and the Rev. T. Tierney, who was connected with the national movement of 1848, was one of the sponsors at his baptism. His father moved to Dublin, and was appointed Taxing Master of the Court of Chancery in 1849. It may be worth recording that his uncle John, an army-surgeon, was one of the veterans of Waterloo.

In 1851, O'Reilly chose the independent course of studying engineering in Paris, and entered the École centrale des Arts et Manufactures in 1852, receiving his diploma three years later. He was then appointed by a French company to develop the zinc-ores of Santander in Spain, and subsequently worked on deposits of sodium sulphate near Madrid. His next engagement was in the Silvermines district of Co. Tipperary; and in 1868, after teaching in the Catholic University College in Dublin, he was appointed to the chair of Mineralogy and Mining in the Royal College of Science for Ireland.

His teaching of these subjects was eminently sympathetic, and his powers as a draughtsman made his delineations of crystals fascinating even to the beginner. At one time, every student who followed the associateship-course in the College passed through his hands in the second year of the curriculum; and few can have forgotten the genuine interest imparted to what many would have considered dead matter and a mere appendage to their other studies. From 1881 to 1895, O'Reilly also held the post of Secretary of the College, and the Department of Science and Art found in him a most punctilious and faithful officer. His personal manner always retained a certain foreign distinction, acquired during his early years in France, and his courtesy never failed him, even when he felt himself bound to pursue an official course in opposition to the views of some one or other of his colleagues. A certain love of detail, and a scrupulous regard for authority, made his scientific work less critical and discerning than his personal experience would have warranted; and to the last his papers were liable to be overburdened with the correlated statements and views of others, which were always accurately acknowledged. Any illustrations furnished by him show his admirable neatness as a draughtsman. During his later years, he was engaged, Sunday after Sunday, in a minute examination of the succession of strata on Bray Head in Co. Wicklow, and he left behind him a number of exquisite coloured drawings of the rock-face as visible along the path. His interest in the Irish language and in archæology brought him into touch with a wide range of research.

A year's illness in 1898-9 compelled O'Reilly to leave the teaching of Mineralogy in the Royal College of Science in other hands; and the chair was united with that of Geology on his compulsory retirement at the age of 70 in 1899. The chair of Mining was at the same time abolished; and the references made by O'Reilly to the union of Mineralogy with Geology, in a letter to the University Commission of 1902, show, to say the least, a generous acceptance of new conditions.

O'Reilly was elected a member of the Royal Irish Academy in 1870, and was Secretary for Foreign Correspondence from 1879 to 1899, and from 1901 to 1904. During these periods he served on the Council, and was one of the Vice-Presidents from

1886 to 1889 and from 1901 to 1904. The gap in his service on the Council, which covers a period of twenty-three years, was occasioned by the illness above referred to. He was President of the Royal Geological Society of Ireland in 1885.

Up to the last, O'Reilly's active mind was directed to papers which he was preparing for presentation to the Academy; and when death removed him suddenly on 6th January, 1905, he was practically still at work on a favourite subject in Irish archæology.

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GRENVILLE A. J. COLE.
HENRY J. SEYMOUR.

ATROPIS FOUCAUDI IN IRELAND.

BY MISS M. C. KNOWLES.

[Read before the Dublin Naturalists' Field Club, 28th February, 1905.]

IN my paper, "Notes on some Additions to the Flora of County Limerick," in the October number of the *Irish Naturalist* for 1903, I mentioned having found a grass in the previous June, while botanising with my friend, Miss Charlotte O'Brien, at Robertstown Creek, in the neighbourhood of Foynes, which Mr. Arthur Bennett said was like the French *Glyceria Foucaudi*. As I had then collected very little material, I waited until I could get a good series of specimens to send to Professor Hackel, who is the authority on this group. In June, 1904, while I was again on a visit to Miss O'Brien, I made an excursion to Robertstown Creek with Mr. R. D. O'Brien and Master Denis Gwynn to get these. The season was a late one, and we did not find the grass in such full flower as it had been on the same date the previous year; still we got a good gathering. Through the kindness of the Rev. E. S. Marshall, some of these specimens were sent to Professor Hackel last autumn. His verdict is "typical *Atropis Foucaudi*, Hack. in Husnot, *Gramina*, page 49, 1896." This is the first record of *Glyceria Foucaudi* (or *Atropis Foucaudi*) from Ireland; *Atropis* is the generic name given by continental botanists to the maritime section of *Glyceria*. This species was discovered in June, 1892, by the late Mons. Foucaud on the banks of the Charente, between Rochefort and the sea, where it grows on the muddy foreshores, forming large clumps on the parts washed by the high tides. It is also widely spread along that river from Rochefort to Port des Barques, and has been found on the borders of salt marshes in the neighbourhood of Fouras. A description of the species was published by Mons. Foucaud in the *Bulletin, Société Botanique Rochelaise*, 1893, p. 43; it has also been described and figured in Husnot's "Graminées," page 49, plate xvii. In England the Rev. E. S. Marshall has

found it in Kent along the shores of the estuary of the Medway, growing on alluvial mud about Port Victoria and Grain (see Marshall and Hanbury: "Flora of Kent," page 405.) These are the only localities in which it was known to grow until I found it in June, 1903, at Robertstown Creek, on the Shannon estuary. The original spot where I gathered it was on the west branch of the creek, close to the railway bridge, but it grows abundantly on the slob lands all round the creek, and on Aughinish. So far as my observation went, and Mr. O'Brien's coincides with it, the grass is confined to these tidal muds between the marks of spring and ordinary tides. On the sandy point of Aughinish we found no trace of it, nor did we meet with it along the rocky beach of the Shannon estuary between Foynes and Tarbert, though we collected specimens of *Glyceria maritima* at several places. At Tarbert, on a piece of muddy foreshore, we gathered specimens which may be *Atropis Foucaudi*, but I have not yet submitted them to Prof. Hackel. Mr. Marshall, in the "Flora of Kent," places his grass under *Glyceria maritima* as a variety; but Prof. Hackel considers *Atropis Foucaudi* a very distinct species, coming nearest *Glyceria maritima*, and says it is distinguishable from all the other maritime species of *Glyceria* by "the silky pubescence of the nerves of the flowering glumes, and the ciliated upper paleæ, &c." Mons. Foucaud places it near *Glyceria festucaeformis*, Gris., a Mediterranean species lately added to the flora of the British Islands by Mr. Præger; and says it can be distinguished from *G. festucaeformis* by the thin walls and large central cavity of the culms, by the numerous barren stems, the broad leaves, the more robust and more developed panicle, the pubescence on the nerves of the flowering glumes, especially at the base, and by the ciliated upper palæ. I have to thank Mons. Tousset, Président de la Soc. Bot. Rochelaise, for a copy of the number of the *Bulletin* containing Mons. Foucaud's original description of the species, and also for a specimen of *Atropis Foucaudi*, from its original locality, collected by Mons. Foucaud. I have thus been able to compare my Irish plant with a type specimen, and, except that the French plant is a little more mature and robust, they seem identical.

As Dr. Rendle, in describing Mr. Praeger's *Glyceria festucaformis* in the "Journal of Botany" for 1903, says he was unable either to see a specimen of *A. Foucaudi*, or to meet with the journal containing the original description of this species—the journal seems to be rather inaccessible to British botanists—I transcribe M. Foucaud's original description :—

Atropis Foucaudi, Hackel *in litt.*

Glauque. Souche émettant de nombreux rameaux épigés, très feuillés et stoloniformes. Chaumes de 6-10 décimètres, striés, robustes, très fistuleux, radicans à la base. Feuilles courtes, planes ou condupliquées, à gaines très longues (quelquefois de plus de 3 décimètres). Ligule arrondie, entière, 1-2 fois plus longue que large. Panicule triangulaire, de 2-3 décimètres de hauteur sur 1-2 décimètres de largeur à la base, contractée après l'anthèse : rameaux 2-5, étalés-ascendants et quelquefois réfléchis pendant l'anthèse, réunis en quarts de verticilles, renflés à la base ; les uns très courts, les autres nus à la base du tiers au quart de leur longueur. Epillets à 6-8 fleurs lâches ordinairement un peu rosées au sommet. Glumes obtuses, largement scarieuses au sommet, l'inférieure trinervée, de moitié à un tiers plus courte que la supérieure laquelle est 4-5 nervée et égale environ la moitié de la longueur de la fleur ; glumelle inférieure peu nervée, soyeuse vers la base surtout sur les nervures, scarieuses du tiers à la moitié de sa longueur, égalant la supérieure ou un peu plus courte ; celle-ci lancéolée à carènes ciliées. Mai-juin.

Cet *Atropis* est voisin de l'*A. festucaformis*, Gris. Il en diffère par ses chaumes comprimés, par ses tiges stériles épigées, allongées, par ses feuilles planes assez larges, par sa panicule plus robuste, plus développée, par ses fleurs à glumelles inférieures soyeuses à la base surtout sur les nervures.

Il croît aux bords de la Charente, où il forme de larges touffes dans les parties baignées par les fortes marées, et est assez répandu de Rochetort au Port-des-Barques. Je l'ai également observé aux bords des fosses des marais saumâtres des environs de Fouras et d'Yves (Charente-Inférieure).

Science and Art Museum.

ON SOME IRISH SPECIMENS OF A LARGE SQUID,
STHENOTEUTHIS PTEROPUS (STEENSTRUP.)

BY A. R. NICHOLS, M.A., M.R.I.A.

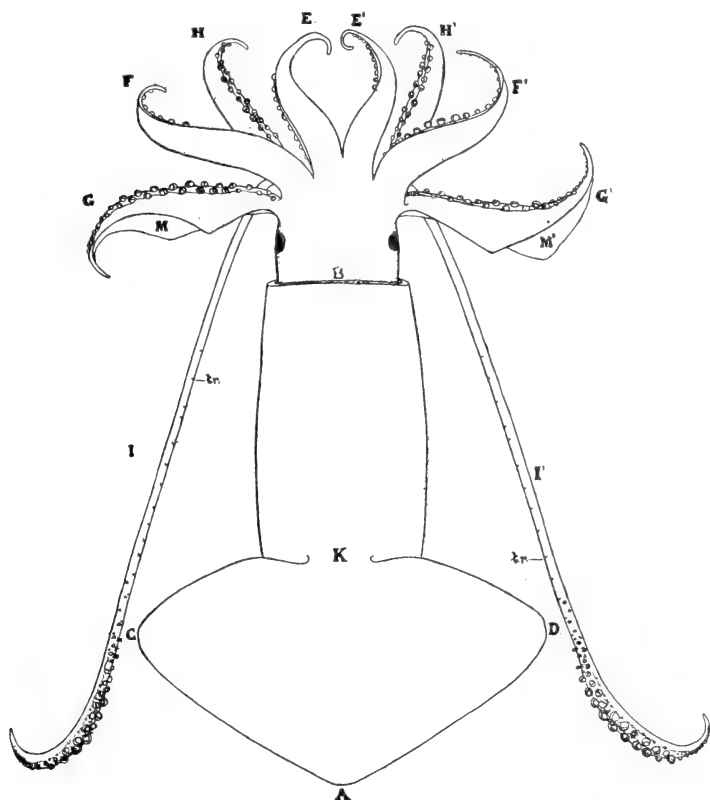
A LARGE Squid was cast on the shore at Miltown Malbay, Co. Clare, a few years ago, and kindly sent to the Dublin Museum by Mrs. Morny, of Miltown House, Miltown Malbay.

I recognised it at the time as belonging to the family Ommastrephidæ, but was not able to determine the species, as the specimen differed considerably from the descriptions of any of the British species of Ommastrephidæ in Norman ('90). A paper entitled "British Cephalopoda, their Nomenclature and Identification," having been published in 1902 by Dr. W. E. Hoyle, the author of the Report on the Cephalopoda collected by H. M. S. *Challenger*, I recently endeavoured to determine the Squid by means of the characters given in this paper, and identified it as *Sthenoteuthis pteropus*.

This species inhabits the Atlantic Ocean, and the first recorded British specimen was captured off Salcombe, Devon, and described by Goodrich ('92), who states that there is in the British Museum an incomplete specimen obtained at Scarborough, November, 1883, and also one captured in the North Sea, February, 1884.

The specimen now recorded from Miltown Malbay was slightly damaged, the head having been detached from the mantle, and some of the internal organs missing; from the absence of any trace of hectocotylistation of the arms I concluded that it was a female. The following are the principal measurements taken by myself shortly after its capture and before it was put into methylated spirits:—Length, from the extremity of the body to the edge of the mantle, A B (see figure), 66 cm. (26 inches); breadth, across caudal fins, C D, 54 cm. (21.2 inches); length of caudal fins along the dorsal line of attachment, A K, 29 cm. (11.4 inches). Each of the first (dorsal) pair of sessile arms, E, E', is 33 cm. (13 inches) long; each of the third and longest pair of sessile arms, G G', is 38 cm. (15 inches) long. On the outer surface of each of the third pair of arms there is a prominent crest or keel, and

along the ventral edge a broad, thin, delicate membrane (M. M') about 6 cm. wide near the middle of the arm; there is also a small lateral membrane on each of the second pair of arms, and a very small membrane on each of the first pair of arms.



Sthenoteuthis pteropus. One-tenth natural size.

The length of each of the tentacular arms, I, I', is 99 cm. (39 inches). The dimensions of the specimen are now rather less, owing to the preservation in methylated spirits; but I find that the contraction only amounts to about 5 % of the original measurements. The length of the mantle in the Salcombe specimen was 51 cm., and of the tentacular arms 64 cm.

The edge of the mantle is nearly straight along the ventral border, but unfortunately is damaged along the dorsal border, and it is not possible to say if it is produced to a slight point dorsally at B as figured by Steenstrup ('87). The caudal fins are large, broad, and transversely rhomboidal, as described and figured by Verrill ('80, '82). The suckers on the sessile arms are strongly denticulated on the outer side of the rim, with smaller or sometimes rudimentary teeth on the inner side. The large suckers of the tentacular clubs are provided with teeth similar to those described and figured by Goodrich ('92), four of the teeth in each sucker being larger than the rest.

The arrangement of the smooth-rimmed suckers and tubercles (connective apparatus) on the tentacular clubs agrees closely with that figured by Steenstrup ('80, '87), and by Goodrich ('92). The arrangement of the folds in the funnel groove, and of the bridles, corresponds almost exactly with the description and figure in Goodrich ('92); the eight folds within the velum are very distinct, and there are four rudimentary folds on either side without, but I do not find any trace of the two outer apertures, and if present they must be very minute.

On the inner surface of the tentacular arms there are transverse ridges (t.r.), commencing close to the last suckers of the club and extending the greater part of its length; there are about fourteen of these ridges, the number observed by Goodrich in the Salcombe specimen.

Sthenoteuthis Bartrami, the other species of *Stenoteuthis* referred to in Hoyle (1902), is smaller, the arrangement of the suckers and tubercles of the connective apparatus is different, and the tentacular arms are not much longer than the third pair of sessile arms (Jatta, '96).

There is in the Dublin Museum the club of the left tentacular arm of a Squid that was captured at Killala, Co. Mayo, many years ago. There are four tubercles on this tentacular club, and only two on each of the tentacular clubs of the Miltown Malbay specimen, but from the arrangement and structure of the suckers I believe this Squid also to have been a specimen of *Sthenoteuthis pteropus*, of rather smaller dimensions than the Miltown Malbay specimen.

Cephalopods of larger dimensions than the Squid described in this paper have occasionally occurred on the British coast, and two gigantic Cuttle-fishes have been recorded from the coast of Ireland. To the *Zoologist*, July, 1875, the late Mr. A. G. More contributed a notice of a gigantic Cephalopod, 19 feet long, which was stranded at Dingle, Kerry, 200 years ago. The short arms were described as being 6 to 8 feet in length, and as thick as a man's leg, and the long arms as thick as a man's arm, but unfortunately mutilated so that their length could not be determined. In April, 1875, another gigantic Cephalopod was met with on the coast of Inishbofin, Connemara, and some account of it was given by Mr. A. G. More in the *Annals and Magazine of Natural History*, 1875. The short arms were 8 feet long, and the long tentacular arms were said to have been 30 feet; the beak of this Cuttle-fish is preserved in the Dublin Museum. Both these Cuttle-fishes belong to the genus *Architeuthis*, but their specific determination is uncertain, though generally regarded as *Architeuthis monachus*.

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REVIEW.

MAN AND THE RAISED BEACHES.

The Larne Raised Beach: a contribution to the Neolithic History of the North of Ireland. By GEORGE COFFEY and R. LLOYD PRAEGER. *Proc. R. I. Academy*, vol. xxv., Sect. C, no. 6, Dec., 1904.

By the thorough-paced stratigrapher the 'superficial' deposits are often regarded as so much rubbish that impedes his work by hiding the 'real' geology. Yet in some respects these latest records of the earth's crust are the most important of the whole sequence, since in them geological time ceases to be superhuman, and overlaps upon the history of our race. And as the province of the geologist merges with that of the archæologist in these deposits, it is fitting that the forces of the two sciences should be united in their investigation. The excellent results which may be obtained from this ideal combination are exemplified in the paper before us, in which a difficult problem is attacked on the two sides so effectively that while either attack taken separately might fail to carry conviction, their united force is irresistible.

In an 'Introductory Note,' we are informed that the paper is the outcome of further research into the age of the Post-Glacial raised beach of the North of Ireland—a subject in which both authors had been previously interested—for the purpose of obtaining evidence to bring forward in the recent lawsuit between the Attorney-General (representing the Crown authorities) and the Trustees of the British Museum regarding the custody of the gold ornaments found at Limavady, Co. Londonderry.

We rejoice that the comparatively unimportant question with regard to these ornaments should have led to a permanent result of such substantial scientific consequence, for assuredly this paper will long be referred to as a standard of information on the subject with which it deals, after the occasion from which it arose is forgotten.

The geological aspect of the problem is first dealt with by Mr. Praeger, whose qualifications for the task are attested by his several earlier papers on the Post-Glacial geology of the North of Ireland, which still represent the highwater mark of our previous knowledge. In the paper before us he summarises this previous work and combines it with later information. He traces the course of events since the close of the Glacial period, and brings out clearly the character of the evidence on which we rely in recognising changes in the relative level of land and sea during this interval. By combining the information obtained from the sections in the estuarine clays at Belfast—more especially that at the Alexandra Dock—and from the raised beach at Larne, Mr. Praeger is able to

demonstrate a series of movements which he ingeniously represents by a diagrammatic curve, the vertical co-ordinate representing the position of the land relative to mean sea-level and the horizontal co-ordinate representing roughly the course of time. The record starts with the land surface elevated 30 feet, at the least, above present sea level, and possibly much more. The chief evidence for this elevation is found in the peat-bed which underlies the estuarine clays in the Belfast section.

Then followed a period of depression, during which the estuarine clays were deposited, the lower clays in shallow water, say from 10 to 20 feet below present sea-level, and the upper clays of Belfast, according to the evidence of the fauna, in deeper water, supposed to be not less than 30 feet in depth.

These upper clays lie some few feet below present sea-level, but after allowing for this, they appear to denote a land level that was not less than 25 feet lower than at present, and there is a difficulty on this point which is freely discussed by Mr. Praeger. The difficulty is that the well-marked raised beach shelf which is so well developed around the shores of Belfast Lough indicates a depression of scarcely more than 10 or 12 feet; and it would certainly be most convenient to correlate this raised beach with the upper clays, since there is no trace of a higher sea-margin in this quarter, except doubtfully at Ballyholme, where the sand and shingle of the old beach rise higher than usual, but where it is quite possible for a storm-beach to have accumulated somewhat above the general level. If it were not for the deep respect that the geologist habitually feels for the conclusions reached by the workers in other branches of science, he might venture to ask whether, after all, the fauna of the upper clays could not manage, even if for this occasion only, to dispense with 10 or 15 feet of their overhead water, which cannot surely be so absolutely indispensable to them, provided that they be allowed plenty of congenial mud in which to disport themselves, and that they never be brought above low-tide level! But out of consideration for the settled convictions of the conchologist we shall not dare to do more than whisper this deplorable heresy, and will proceed at once to acknowledge that if the evidence for the higher shore-line is lacking at Belfast, it is forthcoming at Larne, where Mr. Praeger is able to correlate the implement-bearing beach-gravels, which are elevated about 20 feet above present high-water mark, with the "deep-water" clays of the Alexandra Dock section.

After this maximum of depression was reached, there ensued a movement of emergence by which the land was brought to its present relative position in regard to the sea, or perhaps slightly above this, as the latest change of all seems to have been a slight sinking back from its highest level of emergence. Mr. Praeger is careful to point out that all these changes might be explained either by postulating alterations in the level of the land, or alterations in the level of the sea; but that his evidence is distinctly more favourable to the former of these alternatives, since "the impression produced by a rapid survey of the evidence is that these recent slight fluctuations are of an uneven and local character."

Some very interesting results are brought out by the correlation of this sequence of movements with those that have affected England and Scotland during the same period. Between the north of Ireland and the district around the estuary of the Mersey the correspondence of Post-Glacial events is found to be remarkably close, and a very similar order is traced in the north-east of England, from evidence afforded by the estuary of the Humber. A more general but still correlative succession is also recognised in central Scotland. These movements seem, indeed, to characterise a belt that strikes across from northern Ireland through the north of England and central Scotland, and possibly Belgium, to Sweden, while in the regions lying to northward and southward of this belt the movements during the same period have been of a different character, and depression has predominated.

Having thus clearly demonstrated the order and character of the events with reference only to their relative ages, the geologist steps aside and calls upon the archaeologist to say whether any absolute date can be fixed for these occurrences. This duty is undertaken, in the second part of the paper, by Mr. Coffey, and is ably fulfilled.

After giving a short historical sketch of the discoveries of flint-implements on and in the raised beach at Larne and other places in the north of Ireland, and of the literature connected therewith, Mr. Coffey proceeds to record his personal investigations, and to show the character and mode of occurrence of the relics. The results of an excavation made in the Larne gravels in 1897 under the superintendence of both authors are first described. The Neolithic flakes and cores obtained on this occasion were chiefly from the surface layers; but two cores, of which figures are given, were found at, respectively, 4 feet and 11 feet below the surface. A systematic collection was subsequently made from another section, in which a slice of the gravels measuring 5 feet by 4 feet was carefully removed to the full depth of the deposit, here 10 to 12 feet thick; and although the implements were obtained in much greater numbers, their relative scarcity towards the bottom of the section was again noticed.

The condition of the implements as regards patination and abrasion is then discussed, and it is noted that although there is much variation in this particular, the flints are on the whole most distinctly patinated and abraded in the upper layers, and to a much less extent in the deeper parts of the section. It is concluded that these features are more or less accidental, depending chiefly upon the circumstances of exposure, and are not to be depended upon as an indication of antiquity. A few of the flints show some signs of beach-rolling; but erosion of this kind is not by any means characteristic, and it is held that the gravel containing the implements was not much exposed to wave-action after it was once deposited. The enormous abundance of flakes and the rarity of finished implements is then considered, and is explained as follows:—"The Larne gravels were not a dwelling-site. The general evidence leads to the conclusion that they were a quarry-shop, or roughing-out place, where the flint was sought and flaked to carry away Many of the cores are evidently rejects, cast aside after a few trial flakes were struck off."

The presence of rude celts of a particular type is in this respect most instructive, and is carefully discussed. "The Larne celts would thus seem to be the roughed-out stage or blanks for this class of implement [*i.e.*, 'the rough chisel type, narrow, with somewhat straight sides,' that is more abundant than any other type in Ireland]. Many of them would require little more than the striking off of two facets from one of the ends, one from each face, to convert them into serviceable chisels of the kitchen-midden class, the intersection of the facets producing the cutting edge, while the grinding down of one of the ends would produce an edge of the second [more advanced] class The process of roughing-out the blanks was evidently rapid, and pieces which developed defects in the working, a lump on one of the faces, or an irregular section would be thrown aside." Excellent figures of a large number of chips, cores and celts in various conditions of development are given to illustrate this part of the paper.

The archæological evidence is then brought to a point upon the question as to the age of the Larne beach. "If then, the Larne celts are to be regarded as the roughed out pieces, or blanks, from which the celts of the kitchen-midden types and the narrow forms with ground edges only were formed, the laying down of the Larne gravels cannot, so far as this evidence can be relied on, be brought down to a later period than the earlier stages of Neolithic times." It may here be parenthetically remarked that the carrying back of the Neolithic period to this comparatively early stage of Post-Glacial times lends support to the widely-held view that the earlier Palæolithic period may correspond to the time of the great glaciation of Ireland.

The age of the raised beach is then considered from another point of view. In several places along the northern coast of Ireland, Neolithic occupation-sites have been discovered among the sand-dunes that fringe some of the bays. The relics from these sites indicate a more advanced stage of culture than that of the Larne implements, and appear to range from Neolithic times, through the Bronze Age, and into the Iron and Christian periods. But occasionally, in the pebbly beach underlying the newer accumulation of the sand-hills, flint flakes of the Larne type have been found, and though the evidence presented under this head is not very convincing, it supports the previous conclusion as to the antiquity of the beach-deposits. Exception may here be taken on a minor point, where, on p. 197, the supposed presence of blown sand slightly below the existing high-water mark is adduced as additional evidence for the final slight subsidence that is held to be the latest movement of the land traceable in the district. Dunes of blown sand may, and indeed frequently do, establish themselves on surfaces below the level of high tides.

After thus recounting their evidence respectively, the authors combine in unison in certain conclusions, with the question of the Limavady gold ornaments as a pivot to the argument. These results, so far as Ireland is concerned, are as follows:—"The Larne beach deposits show that Neolithic man was in existence from almost the commencement of the deposition

of that series, until after its conclusion The further evidence of Whitepark Bay and Portstewart carries on the Neolithic period to the conclusion of the period of elevation. Applying this to the Belfast [section], we have the Neolithic period extending from somewhere near the top of the lower estuarine clay (or earlier), through the upper estuarine clay, to the beach deposit of yellow sand which overlies it, or possibly later" "As regards the sandhill sites, the mouth of the Bann shows an advanced Stone Age; and as that river must have been always an important site for settlement, owing to its importance as a salmon river and accessibility to Lough Neagh, it must have been one of the earliest localities for metal in the north of Ireland."

And as regards the wider correlation:—"Over an area, then, including northern Ireland, the southern half of Scotland, and northern England, the land-oscillations during Post-Glacial times appear to have been practically identical. Outside of this area, to the southward, the evidence points to a high land-level in early Post-Glacial times, followed by submergence, as in the area just defined; but the sharp Neolithic uplift, which formed the '25-foot beach' in the area mentioned, appears to die out rapidly northward and southward. To the southward, the evidence points to a continuous or intermittent submergence since early Post-Glacial times, the land having at no time been appreciably lower than at present."

Besides the numerous figures and diagrams by which the text is illustrated, the paper is embellished by five well-chosen and beautifully reproduced photographic plates; and we heartily congratulate not only the authors but also the Royal Irish Academy on the excellent style of the publication.

As an important contribution to Post-Glacial geology the appearance of this paper is well timed, and the authors will probably have the satisfaction of finding that it will rapidly reach its place as a work of reference, for there are many indications that the Post-Glacial deposits of our Islands, after having been sporadically studied during the last half-century, are at length arousing a more general interest, and are likely to receive much wider consideration in the immediate future.

G. W. LAMPLUGH.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include Hedgehogs, from Mr. F. Godden and Mr. Madden ; a Red-breasted Merganser, from Mr. Nagle ; a Japanese Peacock, from the Hon. R. Bellew ; a Zebra Trout, some Brown Trout, and some Rainbow Trout, from Mr. F. Kennedy ; a young Otter, from Rev. E. C. Hannan ; two Golden Pheasants, from Mr. R. G. O'Callaghan ; and a Chinese Gander, from Mrs. M'Donnell. A Pigmy Calf has been born in the Gardens.

JANUARY 31.—The Annual General Meeting was held at the Royal Irish Academy House, Rt. Hon. JONATHAN HOGG in the chair. The Report of the Council submitted by Dr. R. F. SCHARFF, Honorary Secretary, shows that, although the admissions to the Gardens during 1904 were only 172,976 and the receipts £2,368 (as compared with 195,177, and £2,671 respectively in 1903), the management of the Society's affairs has been so capable and economical that the financial position is stronger now than a year ago. At the beginning of the year there was a small balance due to the Bank, while at the close, the credit balance exceeds the liabilities by £46.

Reference is made to the loss sustained by the Society in the deaths of Viscount Powerscourt and Mr. H. M. Barton. The former was President from 1864 till 1869, and his work in acclimatizing foreign species of Deer in the Powerscourt park is well-known to zoologists. Mr. Barton was Treasurer from 1884 till 1889; he leaves to the Society a legacy of £100, which will be devoted to improvements in the aviaries. Mr. A. E. Goodbody resigns his position as Hon. Treasurer and is succeeded by Prof. A. F. Dixon.

How to increase the comfort and happiness of the animals in the Gardens has engaged the serious consideration of the Council for many years past, but out of a considerable number of schemes suggested to improve the accommodation of the stock, it was not found possible to carry out more than a few.

One of these seemed to the Council of such importance that it was taken in hand at once, viz. : to provide a series of dens where animals could be housed when undergoing some special treatment during sickness.

The proper housing of rodent animals next engaged the attention of the Council. After careful consideration of various plans, it was decided to erect a circular structure divided into a number of railed-in enclosures, and to raise the central portion so as to produce an ornamental rockery. Ample accommodation for sleeping dens would thus be provided underneath. The whole structure was completed in August, and the dens have proved to be thoroughly dry. The Rabbits, Guinea Pigs, Prairie Dogs, Porcupines, and other rodent animals seem to be thoroughly comfortable and healthy in their new shelters.

Roses and creeping plants have been planted in a portion of this structure, inaccessible to the inmates, so that it is to be hoped that before long the rather formidable wire partitions, which it was necessary to erect, will be hidden in an exuberant mass of foliage. Excellent photographs of the new enclosure are given with the Report.

The repairs of the Nesbitt Aviary, and the reconstruction of the bird cages inside and outside, which were commenced in 1903, were completed last year. The small birds are now seen to better advantage, and many of them have laid eggs and reared their young in the nesting boxes provided for them, so that the Council have been able to dispose of the surplus stock.

It has often been urged upon the Council that the attractions of the Gardens should combine instruction with a certain amount of amusement. With a view to providing the latter, the Council engaged an Elephant trainer, who very soon succeeded in inducing "Padmahati" to carry an old saddle on which were placed dummy figures, and heavy weights as an experiment. A new saddle was then ordered, and a platform constructed by means of which the elevated position of the animal's back can be reached by children; and hundreds of them have this summer enjoyed the innocent amusement of having "elephant rides" in the grounds. Another form of recreation which has been provided is a small carriage drawn by a Shetland Pony, which likewise has been greatly patronized.

There still remain a number of important works which the Council would wish to carry out as soon as funds are available, such an open-air Monkey House, a new den for Badgers, Foxes, and Hyænas, enclosures for the Pig tribe, an extension to the cages for tropical birds, and many others. At the same time it must be remembered that there are some of the larger animals which the Council would wish to purchase if possible, so that a portion of the future resources may have to be spent in acquiring desirable additions for the collection.

The gifts have been more numerous during last year than for many years past; we may here refer to a few of the more important:—A young Serval from Africa, given by Captain Cramer; a large collection of Irish native birds, given by W. W. Despard; an African Leopard, given by Major Fairtlough; a Mustache Monkey and several foreign Squirrels, given by J. N. Lentaigne; a collection of small Tropical Birds, given by General Sir John Maxwell; a Chimpanzee from W. Africa, given by Dr. Vivian Stanley; an African Leopard, given by Drs. Garland and Montgomery. Altogether no less than 202 specimens have been added to the Society's collection by presentation.

The gifts, however, have by no means been confined to animals. Food for the animals, including meat as well as vegetables and fruit, has been most generously supplied for the Gardens by members and friends of the Society. Mr. T. Smith, of Newry, has presented a hundred holly bushes to plant a considerable portion of the western side of the lake, which will greatly improve the look of the grounds. Finally, several

members of the Council have each contributed a new cage for the Monkey House. These cages were very much wanted, and are not only ornamental, but most useful for the smaller species.

Since the Haughton House was built, the upper storey of that building, including the balcony, has been used as a Refreshment Room. The refreshment department was managed hitherto by a caterer, who paid the Society a small annual sum for the privilege. The Council have now decided to hand over that branch of the Society's activities to a Ladies' Committee. The ladies undertook to look after the whole department, engage a manager, and present an annual statement to the treasurer as to the work done. The Council have received many expressions of praise from visitors to the Gardens as to the quality of the refreshments and the manner with which they were served.

Three litters of Lions were born during the year, but it is greatly to be regretted that two of these died at birth. The three cubs born in the first litter on the 21st July are all males. They are now in the Lion House, and are particularly fine specimens. Their names are "Fergus," "Fin," and "Feodagh." They are the offspring of Pluto, a Dublin-reared Lion of the old stock, and of Lady Macbeth, which had likewise reared a fine set of cubs the year before.

There are now eight Lions and ten Lionesses in the collection, and no less than seven of the Lions were born in the Gardens and five of the Lionesses. Since the new Lion House was built, a collection of about twenty Lions has generally been kept in stock, and only those for which there is no room are sold. Two of the Lions—Remus and Vesta—were placed in an open-air den in 1902. They have been out in the open day and night ever since, and are spending their third winter in the open air without any artificial heat whatever. They are sheltered from the rain in their covered cage, and receive a liberal supply of straw. Being the least promising examples of the collection when the experiment was first tried, they have since greatly improved in condition, and have acquired thick coats of fur.

It may be noticed that in the course of the past year, besides the Lion Cubs, some Barbary Lambs were born, some Kangaroos, Agouties, Llamas, and a number of birds. The Grass Parakeets especially have done splendidly in their open-air cage, and have produced a large number of young.

The Council regret that a large number of deaths have occurred amongst the animals. The Gnu, after having lived in the Gardens for nine years, succumbed to an attack of pleurisy, while the Cinnamon Bear and the great Chacma Baboon lost their lives after a severe seizure of fits. The beautiful young male Giraffe, which had been presented to the Society in the previous year by Sir Reginald Wingate, died in April from blood-poisoning after a serious accident, and the Bactrian Camel succumbed to an affection of the liver. The cause of death of the Chimpanzee was not ascertained. In many other cases the animals had lived in the gardens for a considerable time. It may be mentioned that

the bodies are always utilized to advance the cause of science. Thus not only have the institutions in Dublin, such as Trinity College, the Museum, the College of Surgeons, and the Veterinary College been benefited and enriched by valuable specimens for dissection which would not otherwise have been obtainable, but some have even gone to Belfast, Edinburgh, Perth, and Sheffield, so that the Society has had the satisfaction of furnishing valuable material for research.

Professor Mettam has again supplied the Council with a series of most important statements as to the cause of death of several specimens which were submitted to him, as Honorary Prosector to the Society, for *post-mortem* examination. He has been elected, together with R. M. Barrington and Sir F. W. Shaw, to fill vacancies on the Council.

The Council have continued their policy during the past year of trusting to donations and exchanges in filling any gaps which might appear in the Society's collection. They have felt that any available funds should in the first instance be utilized in providing better accommodation for the animals in the Gardens. The amount spent on purchases of animals did not exceed £90, while five monkeys and over forty birds were received in exchange.

As in previous years, the Photographic Committee of the Council received a series of photographs taken in the Gardens. They were more numerous than usual this year, and also excelled in quality.

The silver medal for the best set was awarded to D. H. Leonard, to whom the Society is much indebted in many ways, and who has very generously placed at the Council's disposal many of the photographs which adorn the report. The bronze medal was awarded to C. M. Finny.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 11.—The Club met at Leinster House. Dr. R. F. SCHARFF, President, in the chair.

F. W. MOORE exhibited hairs from leaves of a species of *Elæagnus* from Bulgaria. The leaves appeared quite silvery, owing to being covered with a number of much-branched stellate hairs, which formed a very pretty object when examined under the microscope.

J. N. HALBERT exhibited mounted specimens of a "scale-insect" infesting the leaves of an Australian palm (*Seaforthia elegans*). The "scale" has not been identified, but it is probably a species introduced with some exotic plant.

Dr. G. H. PETHYBRIDGE showed a section of a pustule on a potato-tuber of a fungus (*Fusarium Solani*) causing a dry rot in stored potatoes, and the spindle-shaped, four-celled conidia of the same fungus. The parasite, which in most cases apparently enters the tuber through artificial wounds, has caused very considerable loss in two cases coming under his observation in stored "seed" tubers this winter, and the disease

may spread from a diseased tuber to an apparently healthy one, so that the diseased tubers should be removed as early as possible, and only undamaged tubers selected for seed purposes.

J. A. CLARKE showed a transverse section through the pharyngeal region of *Amphioxus* showing the excretory tubules of Boveri and Weiss.

D. M'ARDLE showed remarkably well-developed specimens of *Splachnum ampullaceum*, L., which he collected at Collooney, Co. Sligo, in July last, on the excrement of cattle, and on the ground among moist rocks. Under the microscope were exhibited the male flowers and the curious fruit, with a convex lid and a peristome of 16 teeth, in pairs, of a pale yellow colour. The capsule is short and cylindrical, with the highly-coloured, swollen apophysis at the base, which gives the form, which the name suggests, of a Roman ampulla, which tapers into the brilliant red-coloured seta nearly two inches long.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

FEBRUARY 7.—W. H. PATTERSON, M.R.I.A., in the chair. Professor GREGG WILSON, D.Sc., gave a lecture on "The Work of the Ulster Fisheries Association." Dr. Wilson said the ordinary work of the Association was largely carried on by means of the dredge and tow-net. The results of the work of the Association had been many. In the first place, the waters of the Larne district had been sub-divided into areas, and records of all animals found in these had been kept. They were thus gradually getting an idea not only of all the local animals, but of their associations. In the course of this work a considerable number of species not known previously as Irish had been met with, and a few of these had been recorded in the *Irish Naturalist*. Further, in connection with the local work it had been found necessary to prepare lists of all known Irish species of some groups, and several such lists had been compiled. One of them—a list of the Copepoda of Ireland, by Mr. Joseph Pearson—was now in the printer's hands, and would be published by the Fisheries Branch of the Department of Agriculture. This list would be of great use as showing in handy form the results of all previous work at Irish Copepods, besides recording new species obtained by Mr. Pearson. The group was one of the most important for the marine biologist, as members of it were largely fed on by fishes. Besides their lists of marine animals they had now a list of the sea-weeds of Ulster, prepared by a Dublin visitor to their laboratory—Mr. J. Adams. A totally different but equally important kind of work had been carried on by Mr. C. M. Cunningham, who had undertaken the investigation of the drift of our waters by means of bottles containing postcards. From such work very definite results had already been obtained, and these would soon be published. The facts were important in connection with the drift of floating eggs of fishes, as well as with reference to the movements of minute

animals that served as food for fish. A great deal of attention had been given of late by members of the Association to the study of the Herring. With regard to the future, it might be said that, besides carrying on the present investigations, it was proposed to make a special study of plant associations in their waters, to greatly extend their work at Lough Neagh, where Pollan, Eels, and *Mysis relicta* all were attractive, and to endeavour to secure for the Association a new and suitable laboratory at Larne Harbour. That would be of the greatest service to workers, and would probably be of great use for future teachers of nature knowledge. The lecture was illustrated by a series of lime-light views.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 17.—The President (W. J. FENNEL) in the chair. G. H. PETHYBRIDGE, B.Sc., I.F.C.U. delegate from the Dublin Club, lectured on "Plant Structure and Environment."

BOTANICAL SECTION.—DECEMBER 17.—The evening was devoted to the examination of an extremely interesting collection of micro-slides illustrative of the structure of plant tissues, exhibited by Wm. GRAY.

JANUARY 21.—C. J. LILLY, D.I., exhibited and spoke on a large set of mounted alien plants collected at Ballyrudder, Co. Antrim. Rev. C. H. WADDELL, B.D., afterwards delivered a short address on "Twigs, and what may be learned from them."

DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 24.—ANNUAL GENERAL MEETING.—C. B. MOFFAT, B.A., in the chair. Thirteen members were present. The Honorary Secretary read the Annual Report for 1904, which was adopted. The Hon. Treasurer read his report and presented the balance sheet. A prolonged discussion took place on the unsatisfactory state of the Club, the speakers including Prof. COLE, Dr. G. H. PETHYBRIDGE, Miss SINGLETON, Miss CONAN, The Chairman, Hon. Treasurer, and Hon. Sec. The names of the Officers and Committee for 1905 were submitted and passed. Votes of thanks to the Council of the Royal Irish Academy for the use of the Royal Irish Academy House for the evening meetings, and to the Dublin press for reporting the proceedings of the Club, were passed. On the motion of Prof. COLE, F.G.S., Prof. A. C. Haddon of Cambridge, the founder of the Dublin Naturalists' Field Club, and Prof. E. Percival Wright of Trinity College, Dublin, one of the original members, were elected Honorary Members of the Club. After the formal business had been disposed of, Dr. G. H. PETHYBRIDGE moved—"That it be a recommendation to the Committee that a special meeting of the Club be called to consider its future." The motion was seconded by the Hon. Treasurer and passed. Miss Crook was elected an Associate member.

NOTES.

BOTANY.

The Vitality of Seeds.

I have been always greatly interested in the vitality of the seeds of farm weeds. For 60 or 70 years we have kept a book here which shows how each field has been annually cropped.

Take the "Pond field." It was laid down in grass in 1886, and so remained until 1903, when it was sown with turnips without any farm-yard manure; yet *Fumaria*, *Atriplex erecta*, *Chenopodium album*, *Polygonum aviculare*, *Papaver rhæas* all appeared, not plentifully, as is usually the case, but fairly frequently, also scattered plants of *Sinapis arvensis*. On the other hand, *Stellaria media* and *Capsella* (very common weeds) were rare or absent, and *Equisetum arvense*, once common on part of the field, had disappeared. The surface was ploughed and cross-ploughed and grubbed and thoroughly mixed up for the green crop—therefore it is hard to say whether the seeds were originally on the surface or not. This field was top-dressed when in pasture once or twice in the 17 years.

It occasionally happens, however, that we break old lea for a corn crop. For example, "Wall's field" was laid down in grass in 1869, and so remained until 1893. I well remember how surprised we were that year to see *Sinapis arvensis* ("Prassaght") dotting the field of oats with yellow patches here and there. My friend, Mr. S. A. Stewart, suggests that winds, birds, etc., carry seeds to the surface of pasture fields. The wind carries none of the seeds I have mentioned, and when the surface is ploughed for oats with a "chilled plough" it is turned completely upside down, and what was on the surface is buried 7 inches below it after the ploughing, and seeds of farm weeds buried this depth do not in my opinion germinate—I wish they did.

In 1903 I took on lease for ever a field of about 16 acres adjoining my farm. It had been treated so badly that I knew any crop sown on it would be half smothered with "Prassaght." The field was yellow with it the previous two or three years, so I decided to sow nothing for a year.

When the days began to get warm and sunny the "Prassaght" soon showed itself everywhere. I ploughed it all down and turned up a fresh surface, when another crop showed itself; this was again ploughed down and the process repeated six or seven times in the year, on each occasion taking care as far as possible to expose fresh soil. I am sorry to say that the potato crop sown after the fallow in this field in 1904 was full of "Prassaght," notwithstanding the millions of seeds destroyed, and no plants had ripened their seeds for eighteen months. The "Prassaght" occurred chiefly in the deep alleys of the V-shaped drills.

Mr. Adams gives three conditions as necessary for the germination of seeds—water, warmth, and oxygen; there is a fourth, *i.e.*, light, which if not a necessity, is certainly a wonderful stimulant.

I remember a well-known seedsman telling me of a salvage case in which a large quantity of seeds were saturated with sea-water in a damaged or sunken ship. They were in sacks, and when the sacks were brought to the surface the seeds next the canvas sides all sprouted through the sacks, but those in the centre though equally wet never sprouted at all, but dried without sprouting, and I think he said did not lose their vitality, but of this I am not quite sure. My impression is that a great deal has been written on this subject from time to time, though Mr. Adams may be right in saying that there is a paucity of authentic observation.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

ZOOLOGY.

Great Run of Herrings in Killala Bay and the Moy Estuary.

The Herrings appeared in the bay about the middle of September, and a few days after entered the estuary and tidal parts of the river, where they were taken in thousands—some boats taking five and six thousand for their night's fishing. But the most remarkable feature of this run of fish was, that from the time of their entry into the estuary on the 26th of September, they apparently never left, or those taken were replaced by other schools coming in from the bay up to the 21st of November, when, after the severe storm, they quite cleared out of both river and estuary. Still some schools lingered on in the bay, especially on the Killala side, where some herrings were taken on the 12th and 13th December. They were taken night after night, even in the upper reaches of the river, and as the weather was fine and calm every sort of boat was out, from the full-sized yawl with its train of six nets, to the small punt or dingy, with its one or two nets. On some evenings a fleet of twenty boats might be seen scattered over a mile of the estuary. The takes on some evenings were very large, but one day a most extraordinary haul was made inside the training walls of the channel, for during high tide the Herrings passed over the walls from the channel, and remaining until the ebb tide—the water having fallen—were unable to repass over the walls, and their only egress was through the open gaps at the end of the walls, which were closed by the fishermen placing nets across, and thus retained the fish until they were left by the falling tide high and dry on the land, where the men gathered them at their leisure. On the Castlecomer side over twenty-one thousand were picked up, while on the Carrakelly side fifteen thousand were secured. This great run of herrings remaining for such a long time in the river and estuary was a great boon to the fishermen, some of whose earnings were very large. One man, the owner of a first-class yawl, assured me that he received for the fish taken by his boat, from the 26th of September up to the 21st of November, £127.

ROBERT WARREN.

Moyview, Ballina.

Glaucous Gull at Moyview, Co. Sligo.

When out in my shooting punt on February 14, as I was setting up to a stand of Green Plover, I observed a gull standing on a rock off the point of one of my fields. On approaching closer, I saw that it was either an Iceland or Glaucous Gull. So taking up my cripple-stopper, I knocked him over with a charge of No. 6, and found that he was a very fine specimen of an immature Glaucous Gull—probably in the first year's plumage. These birds are very irregular in their visits, for the last bird I observed was on 1st January, 1901.

ROBERT WARREN.

Moyview, Ballina.

Food of the Herring Gull.

Whilst spending several weeks last autumn at Ventry, West Dingle, Co. Kerry, I had many opportunities of studying the habits of the sea-birds frequenting the steep cliffs of that romantic coast. It was possible at a few places for a person to clamber down the rocks to near the sea level, where flat plateaux of low-lying rocks extended into the sea, enclosing, in many places, pools of water much frequented by the various species of gulls and large flocks of Curlews. In making these excursions I frequently came upon little circular patches on the rocks, composed of particles of coarse grain of some kind, separated and washed about by the rain water, and I was puzzled to account for their appearance. Luckily I discovered a place where much of this kind of refuse was scattered about, and found many complete balls, about one and a half inches in diameter, covered and kept in shape by a strong glossy mucus of some kind. On opening several I found they were composed of the broken-up outer covering of oat grains, closely packed together, and evidently voided by some bird of considerable size. Cormorants, gulls, and Curlew were the only birds noticed in the neighbourhood, and I often looked forward to solving the problem of what particular sea-bird had made so remarkable a change in its diet. One very bright September day, whilst sketching near the village of Coome-noole, facing the Blasket Islands, I noticed a large flock of Herring Gulls flying in from the sea, and alighting in a cornfield on the top of the cliffs. Their unusual movements, with outstretched wings, flapping and tossing about among the cut oats lying on the ground, attracted my attention, and I found, much to my surprise, that they were engaged in tearing off the grains of ripe oats from the stalks and eagerly devouring them. That this change of food was freely indulged in was very evident from the number of the above-mentioned indigestible deposits scattered over the rocks, where the birds were in the habit of coming to rest. The lines of a well-known old writer more than once occurred to me—

“My dog, too, altered in his taste,
Quits mutton bones, on grass to feast.”

A. WILLIAMS.

Dublin.

Tree Sparrow in Belmullet, Co. Mayo.

On February 10 a good specimen of the Tree Sparrow was sent me by an esteemed correspondent from Belmullet, Co. Mayo. He had discovered a colony of these birds in that district and sent me the specimen for verification, although he had no doubt of the species. It is very interesting that a colony should have been discovered so far west, as it appears, since its first discovery (in 1852) in the Co. Dublin, to be confined altogether to that Eastern county, though indeed Mr. H. M. Wallis states that he identified a pair frequenting the roof of a cabin on Arranmore Island, off the coast of Donegal, in 1886. (*Zoologist*, 1886, p. 459.) But in 1896, Mr. R. J. Ussher and Rev. A. Ellison visiting Arranmore, found no trace of this bird.

ROBERT WARREN

Moyview, Ballina.

Remains of the Common Mole in Ireland.

Mr. R. Welch has lately sent me a bird's pellet which is especially interesting, inasmuch as it contained a skull of the Common Mole (*Talpa europæa*), an animal unknown as an inhabitant of Ireland. The pellet was found by Mr. Welch in the Benevenagh Woods, Bellarena, Co. Derry, last March, and was most likely deposited by a hawk or buzzard which had flown over from Ayrshire or Cantyre, a distance of fifty or sixty miles.

LIONEL E. ADAMS.

Reigate.

GEOLOGY.

Geological Photographs.

The report of the British Association Geological Photographs Committee for 1903-4 again makes clear the interest and importance of the work on which this Committee is engaged. We are glad to notice that Messrs. Muff and Wright's set of the Pre-glacial raised beach of Cork has been added to the series; for the rest, Ireland is represented in the list of additions by Mr. Welch and Dr. Matley. The total number of photographs received up to the present shows 3,014 from England and Wales 459 from Scotland, and 646 from Ireland. Of the last-named total, over 400 come from the north-east, and are chiefly the work of the Belfast Field Club. When will our other Field Clubs lend a hand? At present Co. Dublin is represented by only 42 photographs, Wicklow by 1 (and that one belongs to Co. Dublin!), Cork by 21 (almost exclusively Mr. Welch's work), and Limerick by 0. Here is a chance for all our Clubs to do really important scientific work, at a minimum of time, trouble, and expense.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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EDITED BY

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AND

ROBERT PATTERSON, F.Z.S., M.R.I.A.

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" " 11a	do. do. do.
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THE PATTERSON MUSEUM, PEOPLE'S PALACE, BELFAST.

A NEW IRISH MUSEUM :

THE PATTERSON MUSEUM, PEOPLE'S PALACE,
BELFAST.

BY ROBERT WELCH AND OTHERS.

[Plates 2-3.]

ON 6th December, 1904, their Excellencies the Lord Lieutenant and the Countess of Dudley visited Belfast, in order that the latter might open a new Belfast institution—the People's Palace. There is a special Cripples' Home attached, a department for the care of children during their parents' working hours; and Great and Minor halls will provide, by means of illustrated lectures, concerts, &c., wholesome entertainment for the young folk of the district in the winter evenings, especially on Saturday nights. The Palace buildings form two quadrangles, the Great hall dividing the enclosed area. They are situated in a densely populated working-class district, and will adjoin one of the proposed Carnegie Branch Libraries of the city. In such a place one would hardly expect to find a Natural History Museum, but there is one, specially designed and fitted for the purpose—surely a sign of increasing interest in the study of nature. This Museum has been named "The Patterson Museum" after the late Robert Patterson, F.R.S., who, over fifty years ago, did so much to popularise natural science in Belfast. It includes a fine lofty room, to which the public are admitted free; this is 75 feet long by 25 feet wide, with an open-timbered roof, as shown in Plate 2; and, in addition, a curator's store and workroom at one end: both rooms are thoroughly heated by hot water. The Museum portion is particularly well lighted, having ample windows along the north side, as well as continuous roof-lights. The wall, central, and window cases are made of well seasoned pine, stained a mahogany colour. A simple system of tightening the doors and lids with long screws renders them

as dust-proof as many in much more pretentious museums. The main collections—mammals, birds, &c—are arranged along the blank wall of the room, while special subjects are illustrated in sloping cases at each window and show-tables down the centre of the room.

The task of planning, as well as collecting for, and filling the cases was entrusted by the managers of the Palace to Mr. Robert Patterson, F.Z.S., M.R.I.A., who accepted the post of Hon. Curator. He was assisted by a staff of willing helpers from the local Field Club, who, as far as possible, undertook some branch they had specially studied. The work was entirely a labour of love, and the material obtained was generously given by a large number of friends. Space prohibits more than the mention of the more important donations:—The Department of Agriculture, per Dr. Scharff, National Museum, Dublin, 150 animals, mounted or preserved in spirits; Sir R. Lloyd Patterson, 47 mounted birds and mammals; Messrs. Williams & Son, Dublin, 25 mounted birds; Robert Patterson, 50 mounted birds, 3 mammals, 28 nests, foreign shells, &c.; D. C. Campbell, Indian butterflies, life-history and mimicry cases; Rev. W. F. Johnson, Irish beetles and butterflies; W. A. Green, large collection of Irish land and fresh-water shells; R. Welch, shells, shell deposits and photographs; Messrs. C. E. Wright, N. H. Foster, W. Keatley, J. Cottney, and Miss C. Patterson, large collections of birds' eggs; George Donaldson, North American butterflies; Ven. Archdeacon Bristow, a cabinet of eggs, butterflies, and beetles, &c.; P. F. Gulbransen, a herbarium of over 800 local plants, &c.; J. W. Taylor, Leeds, collection of foreign land and fresh-water shells; W. Gray, ancient Irish implements, local rocks, &c. All the specimens are donations, not one has been purchased so far, some diagrams on the walls representing the entire amount spent by the Hon. Curator. The collections could not be—so early in the history of the Museum—equally representative; there are, however, several features in the display of them that are admirable, and that promise well for the future. In the first place the labelling is more extensive than is usual in provincial museums. An effort has been made to give some account of every specimen in plain English. The labels (nearly 800 in number) are printed, or typewritten in



FIRST TWO WALL CASES OF THE LOCAL FAUNA SECTION, PATTERSON MUSEUM.

permanent ink, and are placed so as to be easily read. (See Plate 3.) Another point that deserves mention is the fact that the preparations are largely local. Prominence is given to Irish collections; and while specimens from other countries are used to illustrate classification or peculiarities of special interest, they are carefully distinguished from the Irish types.

A short statement as to the principal contents of the Museum may be of interest.

I.—ZOOLOGICAL EXHIBITS.

These form the greater part of the collections. The various classes of invertebrates are illustrated by a few specimens, many local forms being lent by the Ulster Fisheries Association, while the vertebrates, and especially the birds, are more fully exemplified.

One window-case is devoted to the Irish land and fresh-water mollusca. The shells are all mounted in glass-topped boxes, and carefully named. They are not classified in their natural order, but in groups, such as sand-hill and maritime species, shells of the marsh, of lakes and rivers, of ponds and ditches, &c., and each group has a photograph of a typical habitat. A few of the tiny species, such as *Vertigos*, have enlarged photographs mounted in the boxes with the actual shells; some of the slugs are represented by drawings. English species which do not occur in Ireland, at present find a place also in the case, with such exhibits as a picture of a "thrush altar," showing the bird breaking a *Helix nemoralis*, some coloured drawings of *Helices* in their natural habitats feeding, &c., &c. A second case contains such miscellaneous exhibits as shell money, shells as ornaments, curious and valuable shells, &c., these being accompanied, also, with suitable photographs.

There are several cases of insects, arranged in central desk cases by J. N. Milne, mainly lepidoptera and coleoptera. The local butterflies and moths are fairly well shown, and will be added to; the beetles are carefully set and arranged. Foreign insects are represented by collections from India and North and South America, and the Donaldson collection of North American lepidoptera is set in a way rarely seen in this

country. A few cases show protective mimicry, and there are others showing life histories. Additions to these are now in preparation, and will be of local interest as far as possible. The cases for the above, as well as many others, were made by H. L. Orr.

Of the 290 species of birds admitted to the Irish list, the Museum contains representatives of 98, but, as in many cases both male and female, and adult and immature, are shown, the collection of Irish birds is wonderfully large. Each bird has attached to it a label, giving its English name as well as its scientific one, and is accompanied by a map showing the winter and summer distribution of the species, and a note specially describing its occurrence in Ireland. As would naturally be expected in a gift-collection, the commoner Irish birds are entirely absent, and rarer birds are well represented. Thus we find the Thrush, Robin, Sparrow, Rook, Wren, &c., are missing; while, on the other hand, there are good examples of Tree Sparrow, Chough, Great Spotted Woodpecker, Roller, Snowy Owl, Hen-Harrier, Common Buzzard (2), Golden Eagle, Peregrine (3), Goosander, Smew (2), Turtle Dove, and Little Auk (2). As well as the birds in the wall-cases, there are several small well-mounted cases displayed in different parts of the room, and in the foreign section there are about 20 birds to be seen, each with its descriptive label.

The cabinet devoted to the eggs of birds which breed, or have bred, during the last century in Ireland, contains eggs of 100 species out of a total of 134 known, while 34 spaces have been left labelled for those which have yet to be presented. The eggs are not arranged in clutches, but for each species a separate tray is provided, bearing a label with the scientific and common name, as well as a note of the usual number of eggs in a clutch. The remaining drawers contain the eggs of 26 species of birds not known to breed in Ireland, labelled in a similar way. Of Irish birds' nests, 34 are shown in one of the window-cases, each mounted in a glass-topped box, and all but two containing eggs.

Twelve species of Irish land mammals are shown, the rarest being a Marten. There are a few of the more striking foreign mammals, such as Sloth and Kangaroo, while the Carnivora are represented by a Wolf, Jackal, and Bear.

II.—BOTANICAL EXHIBITS.

The Botanical Section (arranged by Miss Helen Kidd), is not as complete as most of the others, but it is hoped—with the assistance and co-operation of local botanists—that it will before long possess a good representative collection of the different divisions of the vegetable kingdom. The collection presented by Mr. Gulbransen is of special interest, and consists of about 800 mounted specimens ; in addition to this he also gave a large number of flowers, dried by his own method, which preserves their natural form and colour. Most of the latter are exhibited in the case, which also contains some very attractive illustrations of nature's methods of enabling certain plants to secure the distribution of their seeds, and several examples showing types of wind and insect fertilized flowers. Carnivorous plants are represented by some pitcher plants and our own common Sundew ; the parasitic group by the Dodder and Toothwort. Various specimens of seed vessels and fruits are shown—teazel and poppy-heads, pomegranates, cocoa-nuts, &c., and two models, lent by Queen's College, show the different parts of the flower-heads of Dandelion and Daisy on a much enlarged scale. On the wall is a series of botanical photographs lent by R. Welch ; and several cases showing the life-history of various trees, and specimens of plants poisonous to cattle, have been lent by the Museum, Dublin. Two wall-frames presented by Canon Lett, show peat-forming Sphagnums and illustrations of the various mosses obtained at different altitudes.

III.—GEOLOGICAL EXHIBITS.

Two cases were allotted to the geological collection in the Museum, one of which has been used for palæontology, the other for the minerals and rocks. As one would expect, a very variable set of specimens was sent in, contributed by many donors, and naturally a great number of the common fossils and minerals of the district are duplicated. With one or two notable exceptions, the specimens sent were unnamed and without locality, a fact which greatly added to the difficulty in arranging them. The fossils are arranged in their natural orders, as it was found impossible to arrange them

with any success stratigraphically. A descriptive label has been typed for each of the orders, and also for most of the fossils, showing, where possible, their nearest living commonly-known relatives. One shelf has been devoted to fossil plants. The minerals were divided into rock-forming and other minerals, the former being followed on the shelves by the rocks themselves. Here again descriptive labels and definitions of minerals, rocks, &c., with their classification have been typed, and where any mineral or rock is used commercially this has been noted, for instance, the making of rock crystal into spectacles. Specimens of the common ores are also represented. What vacant spaces were left on the walls of the case, and on the doors where they did not interfere with the view, were filled with local and other geological photographs, mainly belonging to the British Association series. This section was arranged by Miss M. K. Andrews and G. C. Gough, assisted by R. Bell.

IV.—ETHNOLOGICAL EXHIBITS.

Two window-cases are devoted to stone implements and kitchen-midden finds connected with primitive man in Ireland; flints from various local settlements, bones from Bundoran, Dundrum Bay, and Sydenham, contributed and arranged by Mr. W. H. Patterson; he also gave shells of species used for food from the shell mounds or kitchen-middens at Bundoran. Pictures, as in other sections, illustrate the above in a popular manner. Models of a cromlech, souterrain, dun, &c., made and lent by Mr. W. Gray, occupy one table, while a window case contains many foreign exhibits of interest.

A few exhibits in all the sections have been lent, such as some very fine cases from the circulation branch of the Museum in Dublin, heads of cattle bred by the King, lent by Sawers, Ltd., &c., &c., but as before stated, the great majority of the specimens are permanent gifts. A complete list of the donors will be given in a special report to be issued by the committee of the People's Palace.

THE WILD CAT IN IRELAND.

BY R. F. SCHARFF, PH.D., F.L.S.

IN the report of the Irish Cave Committee sent to the British Association meeting last year, I announced the discovery of the remains of a wild cat in the Clare caves.

I am now working out the mammalian remains of these caves in detail for the Cave Committee's second report, giving fuller particulars of the structure and affinities of this wild cat.

There can be no doubt, to judge from the position and nature of the bones found, that this animal is not long extinct in Ireland. There is even a possibility that a few specimens may yet survive in the more remote mountain recesses of the western districts.

When William Thompson compiled his notes for the contemplated work on the Fauna of Ireland about sixty years ago, he received letters from correspondents who alleged that wild cats then existed in the mountains of Erris in the county of Mayo.

It was then thought that if a wild cat existed in Ireland, it must be of the same species as that inhabiting Scotland. The cave remains, however, prove that the Irish wild cat was different from the Scotch—that it resembled, in fact, a wild cat peculiar to southern Europe and northern Africa, and that its tail was not bushy, but pointed like that of our domestic cat.

Might I urge upon the readers of the *Irish Naturalist*, particularly those living in the western counties, to find out from gamekeepers whether anything has been seen or heard of a wild cat lately. If so, let them if possible secure a living specimen for our Zoological Gardens. I should also be glad to receive cats which have met with their death in traps or which have been shot under the impression that they are tame cats gone wild. Any information on the subject will be gladly received and acknowledged.

The Museum, Dublin.

ON THE VITALITY OF SEEDS BURIED IN THE SOIL.

(SECOND ARTICLE.)

BY J. ADAMS, M.A.

(Read before the Dublin Naturalists' Field Club, 28th February, 1905.)

IN the *Irish Naturalist* for November, 1904, I gave a list of plants, mostly annuals, which appeared after turning up the soil of fields which had been lying for many years previously under pasture. I have long thought that it should be possible, by making a careful analysis of the soil, to obtain the seeds which are actually buried therein. So during last Christmas holidays an attempt was made on the field previously referred to, which has been under pasture for twenty years.

The turfy sod was removed at intervals over the field to a depth of about 3 inches; then the underlying soil to the depth of 3 or 4 inches more was collected. About as much soil altogether was collected as would fill a gardener's barrow, and the total area from which the soil was removed was about a square yard. As the soil was taken from different places over the field its contents would therefore be an average sample of the whole.

This soil was then carefully washed and passed through sieves of various mesh, and the seeds found therein were collected and examined. These reached the number of 829, and this number is very considerably under the correct figure, as the washing turned out a very tedious operation, and a considerable number of the seeds were lost in the process. As these 829 seeds were obtained from about a square yard of soil (and probably more seeds would have been obtained on digging deeper) there would therefore be present in this field at least 4,012,360 weed seeds per acre.

The seeds belonged to the following 22 species:—Wheat or other cereal, Perennial Ryegrass, Sweet Vernal, Birch, *Polygonum Convolvulus*, *P. aviculare*, *Rumex crispus* or *R. obtusifolius*, *Chenopodium album*, *Atriplex patula*, *Euphorbia Helioscopia*, *Ranunculus acris*, Charlock, White Clover, Raspberry or Blackberry, Fool's Parsley, Yellow Rattle, a Labiate (probably *Lamium purpureum*), *Plantago lanceolata*, *Galium*

Aparine, Dandelion, and two other species, of which one was probably *Spargula arvensis* with the girdle rubbed off, and the other has not been determined.

Of these, Perennial Ryegrass, Sweet Vernal, *Rumex crispus*, *Ranunculus acris*, White Clover, Yellow Rattle, *Plantago lanceolata*, and Dandelion still occur in the field. Few seeds of these species were found except in the case of *Ranunculus acris*, where they were numerous. The Wheat seed is doubtless a relic of former cultivation. The Birch and Blackberry seeds are interesting cases of distribution—the former by wind and the latter doubtless by birds. The nearest Birch tree at present is distant about a quarter of a mile in a S.W. direction. The Blackberry seeds were quite abundant, and as most of them were quite empty inside, and have a very hard coat which decays slowly, they probably represent the accumulated deposits of many years.

The other seeds are all those of annual weeds, none of which occur in the field, and are doubtless the representatives of former cultivation. Of this series, *Chenopodium album* and *Atriplex patula* were very abundant.

As regards the question of the vitality of the seeds, it was observed that many were quite empty inside, and these floated to the surface of the water during washing. The bulk of the seeds were, however, heavier than water, and many of these when cut open were quite fresh. A few of the most likely seeds were selected for germination, with the following result. Out of five seeds of *Polygonum Convolvulus*, 3 germinated; of 15 seeds of *Atriplex patula*, none germinated; of 5 seeds of *Chenopodium album*, 1 germinated; while of 10 seeds of *Ranunculus acris*, 8 germinated. It must be mentioned, however, that the seeds after washing had been allowed to become quite dry in the meantime.

In the November number of the *Irish Naturalist* I attempted to give some reason why the buried seeds do not germinate, and the only theory I could suggest was based on the pressure of the superincumbent earth. Some experiments have since been carried out to test the validity of this theory, with the result that it is shown to be untenable—as far as some species are concerned. I took a number of seeds of Barley, Turnip, Red Clover, and Flax, and buried them in soil at a depth of

7½ inches, the soil being firmly pressed together. Other seeds of the same species were mixed with soil in a small stout glass bottle 3 inches long by 1 inch in diameter, which was then laid horizontally at the same depth. The pressure of the superincumbent soil was, therefore, received by the glass of the bottle. In both cases the seeds germinated. The same experiments were repeated at a depth of 18 inches, and after seven days the seeds had germinated.

These results have been confirmed by Dr. Duvel, of the United States, one of the greatest authorities on seeds. According to a summary of his results recently published¹ "germination tests were made of 112 different samples of seed which had been buried in a heavy clay soil for one year. The seeds were buried at the three different depths of 6-8, 18-22, and 36-42 inches. The majority of the seeds retained their vitality better the deeper they were buried. With but few exceptions the seeds of cultivated plants had either decayed or germinated and afterwards decayed at all depths. Weed seeds in some cases retained their vitality remarkably well. The results indicate that the preservation of the vitality of weed seeds when buried in the soil is directly proportional to the noxiousness of the plants producing them."

I am unable to accept Mr. Stewart's view as to the seeds of annuals lying amidst the grass of a pasture field and requiring the ground to be broken up before they germinate. There is abundant moisture among the close blades of grass for their germination, and the conditions of temperature and free access of air are fulfilled. In the same field above mentioned are to be found *Trifolium dubium* and *Crepis biennis*, the seeds of which germinate among the grass.

I desire to express my indebtedness to Miss Hensman, of the Department of Agriculture, for her kind assistance in the identification and germination of the seeds above mentioned.

Royal College of Science,
Dublin.

¹ *Science*, 10th February, 1905.

REVIEWS.

THE BRITISH HAWKWEEDS.

An Account of the British Hieracia. By W. R. LINTON, Vicar of Shirley, Derby. Pp. 8 + 96. West, Newman & Co. 1905. 4s. net.

The publication of Mr. Linton's account of the British Hawkweeds will be widely welcomed, as affording a key to this perplexing genus, brought up to the present time. The book is concise and practical in plan. Something akin to a shudder passes over us on noting that the list of "species" described reaches 124, omitting a number of sub-species and varieties. As in the case of so many English books dealing with distribution in Great Britain and Ireland, we note the incomplete acknowledgment that is given to Irish records. For instance, the widely distributed *H. anglicum* would appear from the notes given to be confined to west Ireland, *H. argenteum* to Kerry, *H. sciophilum* to Dublin, *H. corymbosum* and *H. auratum* to Antrim; yet most of the omitted records rest on good recent authority, such as that of F. J. Hanbury or E. F. Linton. Similarly, *H. rivale*, *H. casium*, *H. gothicum* and a few others, do not appear as found in Ireland at all. It may be that Mr. Linton has only included plants which he has personally examined; but if so it would be well that this were stated. Names new to the Irish list (at least as "species") are furnished by *H. pachyphyllum* (Antrim), *H. crebridens* (Clare), *H. Scullyi* (Dr. Scully's Kerry former "*H. boreale*"), and *H. stictophyllum* (Donegal).

R. L. P.

FOR MOTH-HUNTERS.

Practical Hints for the Field Lepidopterist. By J. W. TUTT. Part III. Pp. 166. London: Eliot Stock, 1905. Price (interleaved), 6s. net.

Like all Mr. Tutt's writings this small volume contains a mine of information for the earnest worker among the Lepidoptera. In his introductory remarks the author points out how effectually the field naturalist can help the studies of the embryologist and morphologist, and how readily the collector can and should himself turn to the solution of some problem of structure or bionomics. That we have here no ordinary moth-hunter's guide can be seen from the instructions for the preservation and photography of eggs (illustrated by several attractive plates), and from the brief but accurate accounts of the external characters of larva and pupa. The bulk of the volume is devoted to a calendar of the leading events in the lepidopterological year, the principal insects likely to occur in any stage of their life-history being catalogued under their "superfamilies," which are in turn arranged under the months.

G. H. C.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Zebu Bull from the Hon. A. S. G. Canning, a pair of Deer from Mr. R. O'Callaghan, a Curlew and a Golden Plover from Mr. R. Warren, two Bar-tailed Pheasants from Mr. A. R. Harris-Temple, a Marmot from Mrs. Peterkin, two dozen Brown Trout from Mr. J. W. Lentaigue, twenty Pigeons, a Pheasant, and a Guinea-fowl from Mr. A. Miller, a Lapwing from Miss A. M'Donnell, and a pair of Buntings from Mr. E. Williams.

A specially valuable gift has been made by the Duke of Bedford, comprising several Rheas and Emus, which have already reached the Gardens.

Some Golden Agoutis have been born in the cage occupied by those animals in the Monkey House. It is hoped during the summer to turn out some of these interesting animals into the Rodent enclosure.

The refreshment-room at the Gardens has been re-decorated, and additional kitchen accommodation provided.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 8.—The Club met at Leinster House, Dr. R. F. SCHARFF, President, in the chair.

Prof. G. H. CARPENTER showed eggs of the fly *Pegomyia betæ* laid beneath the leaves of Mangold. The characteristic ridged pattern on the surface of the egg was pointed out, and the passage by which the maggot, as it hatches from the egg, bores into the leaf-tissue, where its presence causes the well-known blisters.

J. N. HALBERT exhibited examples of a mite, *Rhizoglyphus echinopus*, found in great abundance between the scales of hyacinth bulbs by Mr. W. F. Gunn.

F. W. MOORE showed one of the minute flowers of *Bulbophyllum crenulatum*, Ralfe, a new species which had recently flowered in the Gardens at Glasnevin. It is a native of Madagascar. Its inflorescence, a closely packed spike on an elongated rachis, brings this into the *clavatum* group. The individual flowers are small and brightly coloured; the sepals have very curiously serrulated margins.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 14.—SEATON F. MILLIGAN, M.R.I.A., lectured on the "Cruise around Ireland with the Royal Society of Antiquaries, June, 1904."

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 25.—ALEX. MILLIGAN read a paper on "The Evolution of Plant as compared with Animal Life." After dealing with several definitions the speaker proceeded to trace briefly the pedigree of some existing forms of plants and animals. In the Protozoa, he believed, were to be found the common ancestors of both.

FEBRUARY 1.—THE PRESIDENT, W. J. FENNELL, M.R.I.A.I., read a paper entitled "Half an Hour in Canterbury," in which he described the pilgrimages to the famous shrine of Thomas à Becket, and briefly sketched the history of the church. The paper was illustrated by 50 limelight views, and attention was directed to various architectural features. Previous to the lecture R. Hanna exhibited a number of alien plants.

FEBRUARY 8.—W. A. GREEN gave a practical demonstration on the "Preservation of Birds." In his introductory remarks Mr. Green said that primitive man must have had some idea of skin preservation. He then reviewed the embalming processes of the Egyptians and of the Dutch early in the 16th century, and pointed out the high degree of excellence in the work of present day taxidermists.

FEBRUARY 15.—W. H. GALLWAY read a paper entitled "Sea Anemones, their Structure, Habits, and Life History." Mr. Gallway referred in brief terms to the great antiquity of this group of animals, which can be traced from the Silurian period to the present. By means of a series of diagrams the structure of the group and their methods of procuring food were described.

FEBRUARY 21.—ROBERT BELL read a paper entitled, "Observations on our Home Hills." He said that probably no area within the three kingdoms of such limited extent as the hills in the Belfast vicinity exhibited so many formations worthy of the attention of the geological student. Almost all the rocks yielded fossils, and rock exposures were frequent and easily accessible along the hillsides. The picturesque range of mountains that overlooked Belfast was crowned with Tertiary basalt. Underneath were the Mesozoic rocks, the only rocks of that period now found in Ireland, and therefore of considerable interest. The Mesozoic rocks consisted of the following formations in ascending order:—Triassic sandstone, Lower Lias, and Upper Cretaceous. From the *Ammonites planorbis* zone he had obtained the following fossils:—Vertebrae of *Ichthyosaurus*, *Ammonites planorbis*, *Cardinia ovalis*, *Lima pectinoides*, *Ostrea liassica*, and *Pseudodiadema lobatum* (Wright). This last-named fossil was new to our district, and had first been recorded by the lecturer. The Upper Cretaceous rocks showed great variety of composition, and yielded many fossil remains. Some of his finds proved records for the first time—namely, *Ostrea diluviana* from the yellow sands and *Belemnitella quadrata* from the nodular band. Proceeding, the speaker described how he found for the first time a flint factory on the side of Squire's

Hill. Subsequent searches proved the existence of similar manufacturing at Crow Glen and above Wolfhill. The President congratulated Mr. Bell on his paper, and W. Gray, M.R.I.A.; R. Welch, M.R.I.A.; C. M. Cunningham, L.D.S.; and W. J. C. Tomlinson took part in the discussion which followed.

J. STRACHAN followed with a paper on "The Origin and Growth of Agate and Chalcedony." He dealt fully with the distribution, characters, and history of these well-known minerals. The paper was discussed by W. Gray and R. Welch. Three new members were elected.

FEBRUARY 22.—R. BELL read a paper entitled "Sharks' Teeth from local Cretaceous Formations," in which he said that the specific determination of the detached teeth of sharks presents great difficulties owing to the great variation in form and proportions in different parts of the mouth, and to the similarity of dentition in well defined species. The paper was illustrated by means of a large series of local Cretaceous fossils.

MARCH 1.—G. E. REILLY read a paper entitled "The Carrickfergus Salt Beds." He said that the existence of salt in this district was unknown till the year 1845, when the Marquis of Downshire found the deposits of salt at a depth of 550 feet. The workings of the salt mines were described, and photographs of the workings and specimens of rock salt and the marls in which it occurs were exhibited.

MARCH 8.—PROFESSOR GREGG WILSON, D.Sc., M.R.I.A., delivered an interesting and instructive lecture on "Deep Sea Life." Dr. Wilson said that a very large part of the sea is deep, the great ocean basins varying from about two miles in depth to the extreme limit of five and a half miles. Recent investigations, aided by improved apparatus, had largely added to our knowledge. Animals living at such depths were modified to withstand the great pressure, uniform cold, and total darkness.

MARCH 15.—N. H. FOSTER, M.B.O.U., gave a demonstration on "The Eggs of Irish Breeding Birds," stating that the Irish bird list contained 290 species, of which 135 species breed or have bred in Ireland within the past century. Attention was then directed to the increase and decrease of some of our birds. Examples of the eggs of all the Irish breeding species of birds were exhibited, and the variations in form and colour of the eggs, and the peculiarities in the habits of nidification, were described.

TYRONE FIELD CLUB.

As we go to press we hear with much pleasure that another Irish Field Club has been started, at Dungannon. We wish the new Club every success, and hope that the work of its members may occupy much space in our pages during the near future.

DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 14.—SPECIAL MEETING.—F. W. BURBIDGE, M.A. (President), in the chair. In accordance with a recommendation passed at the Annual General Meeting, January 24, the Committee called this special meeting to consider by what means the interest of the members might be stimulated in the special work of the Club. There were 30 members present, and a number of suggestions were put forward by F. W. Burbidge, Prof. G. H. Carpenter, R. M. Barrington, Miss Ryan, G. H. Pethybridge, R. Ll. Praeger, A. Purser, Miss Singleton, Miss Knowles, and F. O'B. Ellison and J. de W. Hinch (Hon. Secs.).

FEBRUARY 25.—WINTER EXCURSION TO HOWTH.—Members and friends to the number of 27 left Amiens-street terminus by the 1.52 train for Howth, under the leadership of Prof. G. A. J. COLE, F.G.S. On arrival the party walked round the northern cliff path to the Bailey, Prof. Cole explaining at different points the features of geological interest, drawing special attention to the Cambrian rocks which form so great a part of Howth. Prof. Cole also discussed the glacial deposits, giving an interesting account of the different theories as to their formation. After having tea at Howth summit, the party returned to Dublin by the 6.25 train, after a most enjoyable afternoon.

FEBRUARY 28.—The Vice-President (C. B. MOFFAT, B.A.), in the chair. There was a good attendance of members and friends. Miss M. C. KNOWLES read a paper on *Atropis Foucaudi*, a new Irish grass discovered by her last year in the estuary of the Shannon. The paper, which was published in last number of the *Irish Naturalist*, was discussed by R. Ll. Praeger. J. ADAMS, M.A., then read a paper on the Vitality of Seeds, which will be found in full on pp. 80-82. The following exhibits were displayed during the evening:—Case of Irish plants used for dyeing purposes, by Miss M. C. Knowles; Plants collected at Howth during the Field Excursion, February 25, by Miss E. M'Intosh, B.A.; Geological specimens from Howth by Prof. G. A. J. Cole, F.G.S.; Varieties of Green and Golden Plover, by Mr. Edward Williams. Messrs. A. K. Dowling, H. K. Fayle, and Francis O'Brien were elected members of the Club.

IRISH SOCIETY FOR THE PROTECTION OF BIRDS.

This Society, inaugurated 29th April, 1904, has just issued its first Annual Report. During the year efforts were made to spread information on the subject of bird protection by circulating the leaflets issued by the London society.

In consequence of an advertisement which appeared in the *Irish Times*, in July, for a supply of terns for millinery purposes, the Secretary wrote to the Chairman of the Mayo County Council suggesting that he should apply for an extension of the protection of these birds over the breeding season; and a leading article appeared in the *Daily Express* strongly commending the action of the Society. The desired extension was not obtained, but the advertisement was withdrawn, and it is hoped that next year better protection to the terns will be enforced by law.

The success of the Society depends entirely on the response it meets from the public. At present there are 68 Members and 14 Associates. It would be very satisfactory to enrol more children as Associates.

The sympathy of the Inspector and Head Organiser of Science Instruction, under the National Board, has been enlisted by the Society, and he has kindly undertaken to assist in the preparation of a few composition lessons for the use of Irish school-masters on the economic uses of birds. It is hoped to have such lessons published in such a manner that they will attract attention and be of real service in interesting teachers and pupils in questions concerning bird life in Ireland. It is also hoped that as the spring advances some Bird Study Walks with our young Associates may be arranged.

The objects of this Society are the same as those of the Society founded in London in 1889, which has done much good in forming public opinion, and encouraging the preservation and protection of wild birds.

It is intended that the Dublin Society shall endeavour to protect rare species, and prevent wanton slaughter of both sea and land birds; to see that existing laws are enforced; and to promote improved legislation affecting birds in this country.

It is also intended to protest against the wearing of egret plumes and other forms of bird decoration in millinery involving cruelty, and to encourage children and their teachers to take a humane and intelligent interest in nature. The public are invited to support the movement by becoming members and associates, and by their personal influence.

All can help by becoming members or associates, and by inducing others to join the movement; by teaching the young and others to appreciate the value and importance of bird life; by making themselves acquainted with the existing laws for the protection of wild birds, and doing all in their power to see that these laws are respected; and by explaining to friends the cruel methods often employed in obtaining the feathers used in millinery.

Anyone can become a member on paying an annual subscription of 2/6, or a life composition of £1. Children are invited to become associates, and can do so on payment of 3d. as an annual subscription. Lady ARDILAUN is President of the Society.

The Hon. Secs., Miss CONSTANCE PIM, Charleville, Blackrock, Co. Dublin, and Mrs. HOGG, Stratford, Rathgar, Co. Dublin, will be glad to supply information to those interested in the objects of the Society.

ULSTER FISHERIES AND BIOLOGY ASSOCIATION.

JANUARY 27.—The Annual Meeting was held in the Museum of the Belfast Natural History and Philosophical Society, the EARL of SHAFTESBURY in the chair. The Reports of the Council, Director, and Naturalist for 1904 state that satisfactory progress has been made in most of the work undertaken by the Association. Marine investigations have been carried on continuously, but owing to the difficulty of obtaining a steam-launch on Lough Neagh, the freshwater work has suffered. It is to be hoped that a launch on Lough 'Neagh will be placed at the disposal of the members this coming year.

In October the naturalist, Mr. Pearson, left to take up teaching work in Cardiff, and it was with regret that the Council had to lose his services. Mr. Pearson had carried out his duties with entire satisfaction, and had the interests of the Association warmly at heart. After some delay, Mr. H. J. Buchanan-Wollaston began work in December as Mr. Pearson's successor.

The Fisheries Branch of the Department of Agriculture again gave a grant of £100 for certain work chiefly connected with Herrings and the drift of our local waters. This has included the examination of Herring with a view to determining facts in connection with spawning. Nearly 4,000 fish have been examined in the course of this inquiry, with careful records as to the size, condition of various organs, food, etc. This work has been done by Messrs. Pearson, Patterson, Gough, and Wollaston, and the Director. At the request of the Department of Agriculture, a study of the drift of local waters by distributing bottles containing post-cards has been continued. Mr. Cunningham, who has charge of this matter, has now distributed about nine hundred of these bottles, and has had nearly 50 per cent. of them reported as found at various parts of the Irish and British coasts. He has tabulated the results, and hopes soon to publish them. The faunistic survey of Larne Lough was continued during the whole year.

The Treasurer's statement shows a small balance (£20 18s. 8d.) in hand, but the Council most earnestly desire to see the roll of members largely increased, and would urge the present members to see that this is done without delay. If the work of the Association is not to be curtailed, the present small income must be increased.

The Council regret that no further progress has been made towards the realisation of their hopes of obtaining a proper marine laboratory and aquarium. This is an urgent need, and if the importance of fishery work and general marine zoology were only appreciated by the public, there could be no difficulty in obtaining the necessary funds. £5,000 would establish the project on a firm basis, and the Council strongly recommend its favourable consideration. Nothing would give a greater impetus to the work and popularity of the Association than the possession of a properly-equipped laboratory and aquarium.

Mr. Pearson, before leaving for his new post, completed a valuable memoir on Irish Copepoda, and Mr. J. Adams, of the Royal College of Science, Dublin, after vacation work at Larne, has written a paper on the Seaweeds of Ulster.

As in the previous year, daily observations have been made regarding the maximum and minimum temperatures of the air; the specific gravity and temperature of the sea-water; the rainfall; and wind velocity and direction. Whenever the launch was dredging in the deep water outside of the lough, the surface and bottom temperatures of the water were taken. Since the beginning of the year a barograph has been in the Laboratory, and weekly barometric charts have been sent up to Dublin from the Laboratory.

During the spring and early summer some attention was paid to the hatching of Skate eggs at the request of Dr. J. Beard, of Edinburgh. The "purses" were placed in fish boxes, which were anchored near the old pier, Island Magee. This part of the lough was chosen as it probably contained the purest water.

Many additions to the local fauna have been made during the past year, at least one specimen of every species found in the neighbourhood being preserved. Many specimens have been carefully mounted in museum jars, with the intention of gradually forming a museum of local marine animals. In addition to this collection, a large number of local species have been mounted for the new museum at Londonderry.

On the motion of the CHAIRMAN, seconded by Sir ROBERT LLOYD PATTERSON, the reports were adopted, and, after other congratulatory speeches, Prof. Gregg Wilson and Mr. Robert Patterson were re-elected as Honorary Director and Secretary respectively.

NEWS GLEANINGS.

Irish Museum Appointments.

We note with pleasure the Civil Service Estimates for the year 1905-6 provide for the strengthening of the staff of the National Museum, Dublin, by the appointment of two assistant keepers. One of these, we understand, will be attached to the Natural History section of the Museum.

A new Curator has been appointed to the Public Museum, Belfast. Mr. A. Deane, of the Warrington Museum, and our occasional correspondent, Mr. W. A. Green, of Belfast, were chosen out of eighteen candidates by the Advisory Committee, and the Corporation Committee appointed the first named to the vacant post. He was elected a member of the Belfast Field Club on the 21st March.

NOTES.

BOTANY.

A Committee for the Survey and Study of British Vegetation.

[From *The New Phytologist*, vol. iv., January, 1905].

A meeting of British botanists engaged in work on the survey of the vegetation of different areas of the British Isles was held at Leeds on December 3rd, 1904. The object of the meeting was to discuss the present position of the vegetation-survey begun about ten years ago by the late Robert Smith in Scotland, and since continued by others.

The meeting was only a preliminary one, yet it was thoroughly representative. Mr. C. E. Moss (Manchester), Dr. W. G. Smith (Leeds), Mr. A. G. Tansley (London), and Mr. T. W. Woodhead (Huddersfield), were present, while Mr. M. Hardy (Dundee), Mr. F. J. Lewis (Liverpool), Mr. R. Lloyd Praeger and Dr. G. H. Pethybridge (Dublin), and Mr. W. M. Rankin (Portsmouth), communicated, expressing sympathy with the general objects of the meeting, and regretting their inability to be present. The unanimous response from almost all those actively engaged in vegetation-survey in the British Isles indicated the need of some closer co-operation than has hitherto existed.

It was therefore resolved to form a Committee of those present, together with the other gentlemen mentioned above (with power to add to their number), in order to co-ordinate the work which is being done, to secure uniformity of method so far as it may seem desirable, to have a ready means of discussing various topics that arise in connection with methods and results, and generally to advance the interests of the survey. It is proposed to call the Committee "The Central Committee for the Survey and Study of British Vegetation."

The following provisional resolutions, which were adopted, among others, may be of interest to botanists interested in the work.

Scale of Maps.—The survey of the British Isles should be proceeded with. In those areas where the plant-associations are largely untouched by human agency and extend uniformly over considerable tracts, the scales of one inch to the mile or half an inch to the mile, which have been found suitable in the maps hitherto published should be adopted; the field work may be carried out on the one inch or six inch Ordnance maps. In regions which are largely agricultural, general topographical maps on a scale of a quarter-inch to the mile are recommended, with the local features of botanical interest marked in some distinctive manner. Maps illustrating these local features, *e.g.*, marshes, commons, natural woods, &c., on a scale of six inches or of twenty-five inches to the mile, or if thought desirable on an even larger scale, should be prepared as opportunity offers. In this way it is hoped to complete a first botanical survey within a reasonable time.

Colours to be used.—Steps should be taken after consulting with cartographic experts to obtain uniformity in the printing of colours, a point on which some difficulty has been experienced in the past. The question of deciding upon a uniform comprehensive scheme of colours for representing the British plant-associations should be deferred for the present, pending further experience and consultation.

Photographs.—A collection of photographic prints of vegetation should be made, each print to illustrate a definite association or feature of an association, or a definite plant form characteristic of an association. The quality of the negative from which prints are accepted should reach a high standard. There should be no limit of size up to whole plate. Prints should be sent in unmounted and accompanied by a detailed explanation. The collection will be mounted on cards, properly arranged and indexed, will be kept in a definite place to be decided on later, and will be available for reference.

At the next meeting of the Committee, which will probably be held in March, 1905, the provisional resolutions and constitution of the Committee will come up for confirmation. It is also proposed to consider at that meeting a scheme of terminology of the units of vegetation, which can be communicated to the International Botanical Congress to be held at Vienna in June, 1905.

It may be of interest to make a short statement of the progress which has actually been made up to the present time with the work of survey and mapping.

Areas mapped and published, or about to be published.

ENGLAND AND SCOTLAND.

1. W. G. SMITH & MOSS. } Yorkshire (West Riding), The Pennines
and eastward to the Vale of York. About
1,700 square miles. Scale $\frac{1}{2}$ -in. (Geog.
Journ. 1903).
2. W. G. SMITH & RANKIN. }
3. LEWIS. The Pennines and Upper Valleys of the Eden and Tees.
About 560 square miles. Scale 1-in. (Geog. Journ. 1904.)
- ¹ 4. MOSS. East Somerset. About 1,000 square miles. Scale $\frac{1}{2}$ -in.
5. ROBERT SMITH. Northern Perthshire. About 900 square miles.
Scale $\frac{1}{2}$ -in. (Scot. Geog. Mag. 1900).
6. ROBERT SMITH. Edinburgh District. About 700 square miles
Scale $\frac{1}{2}$ -in. (Scot. Geog. Mag. 1900).
- ¹ 7. W. G. SMITH and (the late) R. SMITH. Forfar and Fife. About
1,500 square miles. Scale $\frac{1}{2}$ -in. (Scot. Geog. Mag.
1904-5).

Areas under Survey.—Messrs. Lloyd Praeger and Pethybridge, Co. Dublin (Ireland); Mr. Hardy (Scotland), west of Forfar, Fife and Perthshire, and northwards; Mr. Rankin, Lancashire west of the Pennines,

¹ In the Press.

and Hampshire; Mr. Lewis, extension of Westmoreland area, westwards and northwards; Mr. Moss, Cheshire and Derbyshire; Dr. W. G. Smith, Yorkshire, Cleveland, Wensleydale and Swaledale; in addition some work is being done in North and South Wales, and in Aberdeenshire. It will be seen that considerable progress has been and is being made in this effort to obtain a systematic acquaintance with British vegetation, and to reduce it to a form in which comparison can be made between regions widely apart. Gaps are still numerous, however, even in the mountain and moorland country, while considerable areas of ecological interest are untouched, and will probably remain so unless undertaken by fresh workers.

Ecological Study of Vegetation.—The above-mentioned surveys of wide areas carried out on a comparatively small scale and affording only a primary analysis of the vegetation, ought to be supplemented by work of a more detailed character. This is also being undertaken. Mr. T. W. Woodhead recently communicated some of his results to the Linnean Society (December 15th, 1904). Mr. Woodhead has devoted himself principally to the survey and study of woodland areas in South-west Yorkshire. The mapping is done on the Ordnance Survey maps of six inches and twenty-five inches to the mile, and all kinds of data bearing on the vegetation have been collected. The biological laboratory at the Technical College, Huddersfield, is available and suitably equipped for ecological research, and is within easy reach of the woodlands. In the woods themselves convenient huts have been placed at the disposal of workers for the purpose of research, and every facility has been granted by the owners and by a neighbouring resident to those desirous of making experiments and observations on the spot. Mr. Woodhead is thus doing pioneer work in this department so far as this country is concerned. Mr. Tansley has also begun mapping work on a similar scale in Kent. The Committee is desirous of promoting this more detailed survey and study side by side with the mapping of large and more uniform areas, and will be glad to give further information.

Communications may be addressed to the Secretary of the Committee, Dr. W. G. Smith, The University, Leeds.

ZOOLOGY.

Death's Head Moth near Wexford.

Mr. G. Redmond, Wexford, presented me with a beautiful specimen of *Acherontia atropos*, taken at Maudlenstown, near Wexford, last October. It was dead when I received it, but I was most successful in relaxing it on wet sand, and it is now in my collection.

J. H. JOHNSTON.

Wexford

Further Evidence of Lough Neagh Fishermen as to the Causes of Injuries to Pollan.

Henry Mulholland of Dungonnell, said the mischief was caused by the "ramper eel" mainly. (This is the local term for the small River Lamprey, which is from eight to ten inches long, and about as thick as a good sized lead pencil.) The Pollan has seasons of weakness when it is very liable to the attacks of the "ramper," whereas, when it is quite strong, it is seldom attacked. He had, he believed, landed as many as forty "rampers" after a single fishing journey, many of them still sticking to the sides of the fish, the effect being dark wounds which during the cooking process often appear as holes. Cormorants are answerable for torn and gaping wounds in the backs of Pollan. They are in the habit of diving down to the nets, especially when comparatively near the shore, and attacking the fish fast in the meshes of the net, and he has occasionally found a Cormorant in his net, or so entangled as to be caught. The fishermen look upon the Cormorant as an enemy, and about ten or twelve years since, induced the authorities to put a price upon its head, *rs.*, which led to the destruction of a good many, and they are not now as numerous as they were prior to this arrangement. The hooked bill of the Cormorant is a weapon well adapted for causing the torn wound in Pollan.

David M'Keen of Dungonnell, says the "ramper" cause the dark circular wounds on Pollan. There are few "rampers" now, but four years since there were great numbers. He believes he brought in his boat at the time stated, two dozen "rampers" among a catch of Pollan, and that perhaps four of that number might have been adhering to the sides of the fish. The Cormorant is also answerable for much mischief especially in the early part of the season. They dive down and attack the Pollan when fast in the meshes of the nets.

Andrew Moore of Dungonnell, says the injury noticed in Pollan is due to the "ramper" sucking the fish. He has seen a dozen "rampers" brought in his boat with the morning's taking of Pollan, some still sticking to the fish. He has witnessed this frequently. The Cormorant is also very destructive to Pollan. They dive down to the nets and tear the fish. Pollan have been found whole in the gizzards of Cormorants.

David Moore of Dungonnell, had previously made a statement similar to the foregoing by his father, Andrew Moore.

Edward Harkness of Ballginiff (formerly a fisherman, but now a farmer), says the wounds on the sides of Pollan are caused by "ramper eels." He has seen "rampers" sucking Pollan hundreds of times. The Cormorant is very injurious to Pollan. It dives down to the nets as they lie on the bottom of the lake. The "ramper" also attacks Trout, which have been observed to jump out of the water as high as his house in their endeavours to shake off the creature. Pollan are not strong enough to leave the water when attacked.

James Hannan of Antrim, says the wounds on the sides of Pollan are caused by "ramper eels." He has caught the "rampers" many times sucking the Pollan so that holes have been noticed in their sides. Has seen Trout jump high out of the water when the "ramper" was sticking to them. He has lifted a "ramper" by the tail when sticking to a Pollan, and the "ramper" has still held on, the Pollan being lifted with it. The tearings and cuts in Pollan are caused by Cormorants. These are wily birds. On seeing a buoy attached to a net, they will dive down and attack the Pollan that are caught in the meshes, and tear or cut them in their endeavour to get them out of the net. The dark spots on Pollan and holes were at one time thought to arise from disease, but no one believes that now, as they have been found to be caused by "rampers."

William Hannan of Antrim (brother of James Hannan) having heard what was said by his brother, agreed entirely with his statement, only adding that some Pollan when attacked rush in a distracted manner just below the surface of the water in their efforts to rid themselves of their foes.

Robert Heaney of Antrim, having heard the evidence of Henry Mulholland read over, said he concurred entirely with it, and that the Cormorant would dive seven fathoms to get to a net with Pollan in it.

W. S. SMITH.

The Manse, Antrim.

The Scaup-duck on inland waters.

The only notice of the Scaup (*Fuligula marila*) on fresh water in the North of Ireland, given by Thompson, is that of a flock on Ballydrain Lake, 2nd April, 1848. Ussher ("Birds of Ireland,") mentions that the Scaup is a regular frequenter of Lough Neagh in winter, but its occurrence on inland waters is exceptional, and when the bird is so found it is generally only as a straggler; he also gives a few instances of its capture inland, mainly in the South and West.

In December, 1903, the remains of a bird of this species shot on a small lake in this locality were submitted to me. On 24th January, 1905, I heard that a large flock of duck, said to include Mallard (*Anas boscas*), Wigeon (*Mareca penelope*), and Golden-eye (*Clangula glaucion*), had been observed on another lake of about twelve acres extent in this neighbourhood, but on going out next morning only one duck was to be seen, which proved to be a Scaup, though I afterwards saw two Wigeon shot here the day previous. In both instances these Scaups were females, the broad white band round the base of the mandible being clearly distinguished.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

Whooper Swan at Lough Neagh.

While walking along the shore of Lough Neagh, between the mouths of the Glenavy and Crumlin rivers, in February last, I found on the shore the body of a young swan. There were signs of ash grey on the back, the bill was edged and tipped with black, and showed signs of changing from a flesh pink, of which there was a lot remaining. The measurements agreed with those of the Whooper (*Cygnus musicus*) in all but the length. This made me refer the matter to Mr. Patterson and Mr. Foster; the former wished to see the head, the latter the sternum, both of which I duly sent. They both agreed it was undoubtedly the Whooper. The Whooper is much larger than the commoner Bewick's Swan (*C. Bewicki*). The peculiarity of the sternum and trachea of the Whooper and Bewick's Swans I copy from Newton's Dictionary of Birds. "The sternum is penetrated by the trachea nearly to the posterior end of the keel, hence it turns forward and upward again to revert and enter the lungs; but in the larger of these species (*i.e.* Whooper) when adult, the loop of the trachea between the walls of the keel takes a vertical direction, while in the smaller the bend is horizontal, thus affording an easy mode of recognising the respective species of each."

E. L. L. MCCLINTOCK.

Glendaragh, Crumlin.

Unnecessary Bird Killing.

The shooting of a Glaucous Gull (*Irish Naturalist*, 1905, page 71), is to be strongly deprecated by all true naturalists, this species being well known as an occasional visitor to our coasts. Sixty-five cases of its occurrence in Ireland have been recorded, of which no fewer than twenty-three are assigned to the Counties of Mayo and Sligo ("Birds of Ireland," Ussher and Warren). Mr. Warren can scarcely plead that he required this bird as a specimen, for writing in 1892 (*Irish Naturalist*, vol. i., p. 154), he says, that up till 1880, he had wounded one and killed five birds of this species. And he admits that he recognised this bird before shooting it as either a Glaucous or an Iceland Gull.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

Little Auks off Co. Donegal.

On February 17th I saw from the steamer "Sicilian" three Little Auks, *Mergulus alle*, three miles N.E. of Innistrathull. They allowed us to approach them rather closely, when they flapped away in a N.E. direction. It was blowing a moderate westerly gale, and a high sea was running at the time.

J. TRUMBULL.

Malahide.

WILLIAMS & SON.

Naturalists, Furriers, and Taxidermists,

2, DAME-STREET, DUBLIN,

Designers of the Life Groups in the National Museum, Kildare-street.

HEAD AND ANTLERS OF THE GREAT EXTINCT IRISH DEER, *CERVUS GIGANTEUS*, GENERALLY IN STOCK

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CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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THE DURATION OF FLIGHT AMONG BATS.

BY C. B. MOFFAT.

(Read before the Dublin Naturalists' Field Club, 21 March, 1905.)

I AM not sure that the subject of Bats is of interest to most people, or even to most naturalists ; but to me they have always been fascinating animals, and it surprises me to find, from time to time, how very little is known about them. Some years ago attention was drawn by Dr. N. H. Alcock, at that time one of the hon. secretaries of this Club, in a most interesting introduction to a series of articles which he unfortunately has not had time to complete, to the extraordinary dearth of our information about Bats, and particularly about the habits of Bats. For one thing—Are they nocturnal creatures or are they not? We all know that it is their usual practice to come out of their sleeping places a little after sunset, some kinds being rather earlier than others ; but Dr. Alcock showed that scarcely anything was known concerning their further movements. He raised the question, "How long do Bats fly?" After setting out on their after-sunset excursions, do they "not go home till morning," or do they just fly while there is enough lingering twilight to guide their entomological pursuits? Surely it was a singular thing that such a question could need to be asked in one of the closing years of a century famous for devotion to zoological research. Yet there was then only one British Bat concerning whose habits anything definite could be stated, and I have reason to believe that only half the truth had been ascertained about it. I refer to the Noctule—a species which happens not to be found in Ireland. The Noctule had been repeatedly seen by various observers returning to its den before the twilight was quite gone ; in fact, its whole flight occupied only about an hour. It is, doubtless, well known that the Noctule is a very large Bat—it is the so-called "Great Bat" of Gilbert White's delightful Selborne letters—and in consequence of its superior size it can be seen entering its sleeping place at hours when the Pipistrelle or the Long-eared or the Whiskered Bat would be

practically invisible, and even the Hairy-armed Bat—our largest Irish species—extremely difficult to distinguish against the trunk of a tree. Therefore, it was a nice lazy plan to assume that what was true of the Noctule was probably true of most other sorts of Bats; and that is what, up to the present time, most English naturalists have done. I am sorry to say that a peculiarly unfortunate example in that respect seems to me to have been set by that very high authority, Dr. Dobson, who lays it down as a general law in his “Catalogue of Chiroptera” (p. xvii., footnote) that “Bats without nasal appendages are more properly crepuscular and matutinal than nocturnal in their habits.” For this sweeping statement I am afraid Dr. Dobson had no better warrant than conjecture. If it were strictly true only one Irish Bat, the Lesser Horse-shoe, found in a few of our western counties, would be entitled to be called nocturnal. Dr. Dobson doubtless drew the line where he did from an idea that those nasal appendages which adorn the Horse-shoe Bats, and which are known to be extremely sensitive, were of use instead of eyes when it got too dark to see, and that Bats destitute of them would be unable to get on without a good deal more light. However, the same could evidently be suggested about the enormous sensitive ears possessed by the Long-eared Bat, and so, we find, it has been suggested about that species in Bell’s “British Quadrupeds” (2nd edition), where the author lays it down that the Long-eared Bat probably flies all night, while the other common kinds have, he believes, to retire early, in consequence of their want of any corresponding special equipment. Of late there have been several rather imposing books on British Mammals produced, in which I can only say the subject is no further advanced. The latest and most expensive is that of Mr. J. G. Millais,¹ of which the first volume appeared last November, and which affords a very fair sample of the way Dr. Dobson’s guess has influenced scientific thought—or, at least, the thoughts of scientific persons—on the subject of the habits of Bats. Treating of our very commonest Bat, the Pipistrelle, Mr. Millais admits that little or next to nothing is actually known about the duration of its flight; but he adds that he has “no reason

¹ “The Mammals of Great Britain and Ireland,”

to suppose that it is nocturnal," and so he thinks that it "only flies late in the evening." Thus the acknowledged fact of nothing being known about it is made a ground for placing it in the crepuscular rather than the nocturnal class. The adoption by a leading naturalist of so singular a line of argument shows how fashionable the belief has become—in consequence, no doubt, of Dr. Dobson's dictum—that evening flight is the rule among British Bats, and all-night flight the exception.

Well, with Dr. Alcock's help, I made some observations on these subjects, extending over several summers, which resulted in our ascertaining the truth about four species of Irish Bats, of which there are altogether seven. The four whose flight-times we succeeded in ascertaining are the Long-eared Bat, the Hairy-armed Bat, the Common Bat or Pipistrelle, and Daubenton's Bat. As regards the first two, the results have already been published,¹ but I may repeat here that the Long-eared Bat was shown to fly all night, and the Hairy-armed Bat to conduct itself in a very different manner. That creature flies only in the two twilights, morning and evening, each time for about an hour or an hour and a quarter, and passes the rest of the night—that is to say, far the greater part of the night—in the same sleeping-hole in which it spends the day. So the Hairy-armed Bat's idea of the quantity of sleep it requires on a summer's day is $21\frac{1}{2}$ hours, while in winter it takes an almost uninterrupted rest for six months. Of course, these facts were only ascertained gradually. We were first led to suspect them—or rather, Dr. Alcock was led to suspect the early retirement—because this big Bat used to disappear from view before the little Bats did, which is the opposite of what ought to happen if they all flew equally late. Then Dr. Alcock shot some specimens which could not have been flying more than an hour, and really the creatures were so monstrously full—so round and firm and hard (almost like cricket-balls)—with the quantity of insect food they had gorged in that short interval, that it seemed to both of us utterly impossible that they could want to feed any longer. In the end, having discovered that they

¹ *Irish Naturalist*, vols. ix., pp. 235-40, and x., pp. 241-51.

were visible in the mornings as well as in the evenings, I got one of their sleeping places by watching a group of these Bats in the morning till they went home into the hollow of a decaying ash-tree; and then, as it proved useless watching in the dim light of late evening to see whether they also went home for the night, I tried pinning a net in the middle of the night (August 12th-13th, 1900), across the mouth of the sleeping-hole, with the result that about three o'clock in the morning a Hairy-armed Bat was caught in the act of coming out. That proved beyond question that this largest of Irish Bats passes the night indoors, as it also does the day, flying only in the short intermediate zones of the twilight, during which it whizzes about with wonderful velocity, and does remarkably well for itself in the way of laying in food.

Of course, the precise time of the Hairy-armed Bat's retirement for the night was not ascertained by the midnight net experiment. The *morning* flight was shown by that experiment not to exceed some sixty-five or seventy minutes; but for the measurement of the evening flight we have still to be pretty largely guided by the fact of the animal's almost invariable disappearance from view, and of the cessation of its characteristic screeching cries, about an hour and twenty minutes after sunset. On two occasions, however, I was fortunate enough to see the Bat in the act of going home: on the evening of August 13th, 1900, when (as already recorded in the *Irish Naturalist*) the retirement took place 81 minutes after sunset, and on that of June 5th, 1901, when it took place 82 minutes after sunset. In the earlier instance the Bat observed belonged to a small colony, so the period for which the individual had been on the wing could only be told approximately, but it had certainly not exceeded seventy-five minutes, nor had it been less than seventy-one. The observation of June 5th, 1901, which was not recorded in my former paper, is in this respect more complete, since the Bat which formed the subject of it lived quite alone, and had been timed, the same evening, quitting its retreat four minutes after sunset. It had, therefore, flown for exactly seventy-eight minutes.

I now come to the Pipistrelle. This is the common Bat which we see everywhere. Systematic zoologists have com-

monly placed it in the same genus with the Hairy-armed Bat and the Noctule, and from that we might expect that its habits would not greatly differ from theirs. So, though one good naturalist, William Macgillivray, said long ago, in his "History of British Quadrupeds," that it probably flies all night, it is not, perhaps, very surprising that since that time other naturalists have almost unanimously contradicted him, and asserted that it probably flies only in the evening. However, the net result of my observations on the Pipistrelle is that it really flies all night. On an average, it is only about seven minutes later than the Hairy-armed Bat about starting on its flight in the evening, and it is equally late with the Hairy-armed Bat in returning to its retreat in the morning; but the difference between them is that the Pipistrelle has been out the whole of the intermediate time, while the Hairy-armed Bat, putting his evening and morning flights together, has not been out for much more than a quarter of it. These facts seem to me so singular, that I think the evidence for them should be made plain.

Of course, in observing Bats, one must be very careful that one knows what sort of Bat one is observing. The difficulty of being quite certain on that point vitiates a good many observations that might otherwise be useful. However, I began my inquiries into the Pipistrelle's habits by passing a night in the open air in bright moonlight, in a spot where large numbers of bats generally fly. The result of this preliminary mode of inquiry (on the night of August 21st-22nd, 1899) was that I found that there were lots of Bats visible on the wing at all hours throughout the night, as well as in the clear light of early morning. That was not conclusive, because, in the first place, these Bats might not all have been Pipistrelles, and, even if they were, some might have gone home early and others come out late, so that there was no proof that any individual Bat, Pipistrelle or otherwise, had been flying about the whole time. The next thing to do was, therefore, to find out where some of these Bats went in the morning. By watching on several mornings, in the summers of 1899 and 1900, I ultimately got the retreats of half a dozen, each living a perfectly solitary life in a little den of its own—some in holes in walls, and some in the trunks of trees.

That made it possible to play the detective on these six individuals, and I soon found that the hours of all six were very similar, and, on the whole, very regular. Each of them left its retreat every evening during the half-hour after sunset, and returned to it every morning during the hour before sunrise. The time of emergence would, indeed, vary, even for the same individual Bat, from so early as ten minutes to so late as thirty minutes after sunset, and the time of retreat similarly varied, from so early as forty to so late as eighteen minutes before sunrise; but in no instance did a Bat whose sleeping-place was known, on occasions when I watched for its emergence, fail to come out during the evening twilight, or, when I looked for its return in the morning, disappoint my expectation of seeing it go in. After ascertaining this much concerning their habits, I caught three of these animals as they were coming out, and they proved to be *Pipistrelles*. I have no doubt the remaining three were the same. That does not yet tell us all that we want to know, but it tells us something. Not only is it shown that a good many *Pipistrelles* are on the wing during the hour before sunrise, but it is also established that these are the same individual *Pipistrelles* which left their retreats early after sunset the previous evening, and not, as might be imagined, mere belated individuals that had overslept themselves before coming out, and were making up for it by breakfasting late.

But no amount of mere watching, moonlight or otherwise, would tell whether these animals remained away from their sleeping-places all night, or whether they followed the Hairy-armed Bat's rule of taking a midnight nap. So, on the night of August 16th, 1900, I did what I had done four nights previously in the case of the Hairy-armed Bat, and fixed a net at midnight over a hole which a *Pipistrelle* had quitted the previous evening twenty-eight minutes after sunset. The result was the opposite to what had happened in the case of the Hairy-armed Bat. At 3.45 in the morning no Bat had come out of the hole, and as it now wanted only an hour to sunrise, it was time to remove the net so as to let the Bat in. Of course I kept watch to see that it did go in, and at twenty minutes past four—some twenty-eight minutes before sunrise—I had the gratification of seeing it make its usual return

Now there could be no doubt, in the case of that animal, that it had been out all night. All that remained was to make sure—a very important matter—that I was right concerning its species; so the next evening I set the net again over the same hole, caught the Bat as it came out, and found that it was a male *Pipistrelle*.

The above experiment was made on a fine bright night, so I thought it safer to try it again on another Bat under less comfortable conditions, choosing, this time, a dark and foggy night, when nobody could suppose that Bats would be specially tempted to fly late. Such a night occurred on August 30th, 1900, when I netted the residence of a second *Pipistrelle*. The result, however, was just the same as in the former case. No Bat came out after midnight; but, at the usual time before sunrise, the occupant of the hole went in. Hence, it follows that even during raw and foggy nights, when insects might be presumed scarce, the *Pipistrelle* does not retire into its den, but continues abroad till its usual hour for seeking sanctuary in the twilight of the early morning. I even find that the same thing happens in winter when the nights are warm enough for the *Pipistrelle* to fly. I have several times seen it at midnight in the long nights of December and January, and though I have not stayed out at that season to see it going home at seven or eight o'clock in the morning, I have trustworthy information from one whose vocation brings him out at those hours (Mr. James Kelly, Ballyhyland), that it stays on the wing till nearly daylight—in other words, flies through a sixteen hours' night.

Now surely this animal must differ more than is commonly supposed, in point of structure and relationship, from creatures like the Hairy-armed Bat and Noctule, which feed fast and furiously for a short hour or so, and then sink into lethargy like the sleep of winter. The contrast is rendered greater when we consider the disparity in size. The *Pipistrelle*, being less than one-third of the weight and bulk of the Hairy-armed Bat, or one-fifth that of the Noctule, cannot in the nature of things require nearly so much food as these animals do; yet it allows itself the whole night to collect the lesser quantity, while each of its formidable cousins despatches the greater in little less than an hour.

Of late years it has become a moot point whether the Hairy-armed Bat, Noctule, and Pipistrelle should continue to be grouped in the same genus (*Vesperugo*), or whether the first and second should be grouped apart from the third in a genus for which the name *Pterygistes* has been proposed. This alteration appears to have been rather reluctantly accepted by Mr. Oldfield Thomas,¹ who expressed himself as doubtful whether the differences were sufficient to warrant it; and Mr. Millais is evidently of opinion that Mr. Thomas's doubts were justified. For my part, I cannot help thinking that the very wide difference shown to exist between the feeding habits of the Pipistrelle and those of the two other species amounts to a strong argument for the genus *Pterygistes*, and that there must be some important internal differences, sufficient to justify generic separation, between those bats which take a whole night to satisfy their feeding requirements and those that cram themselves to bursting-point, either once or twice in the twenty-four hours, during a 70-minutes' career of mad excitement among the twilight-flying beetles and gnats.

By the way, I must not be taken as suggesting that the large crepuscular Bats "bolt" their food. On the contrary, nothing is swallowed by these animals which has not first been masticated with the most consummate thoroughness. In proof of this, I may mention that the contents of the stomachs of several Hairy-armed Bats shot during their evening flight were examined with great care at Dr. Alcock's request by Professor G. H. Carpenter, who, however, found all the fragments so minute that the species of only one insect—the yellow-haired fly, *Scatophaga stercoraria*—could be identified with certainty; while among the countless other fragments, chiefly dipterous, a few were found referable to an Acalypterate muscid, a midge, probably a Mycetophilid, and some caddis flies (*J.N.*, vol. viii., pp. 35 and 172). The teeth of the Noctule, doubtless, do their work with equal effectiveness, and all lovers of Gilbert White will remember that passage in his letter of September, 1771, in which he gives Pennant the description and measurements of the two

¹ *Zoologist*, 1898, p. 100

examples he had shot at Selborne, and adds that "their maws were full of food, but so macerated that the quality could not be distinguished."

These facts must increase our astonishment at the truly monstrous rate at which the Bats of this group consume their prey. In the case of the Hairy-armed Bat I may add that the rate of digestion must be equally prodigious, since I have found that even in the short nights of June that creature takes its *two* flights, evening and morning, with the same regularity as in August. That is to say, having retired in the "cricket-ball" state, already referred to, a few minutes before ten on a June night, it comes out again a few minutes after two, active and hungry as a hawk, for another short but furious banquet.

Whether the Noctule shares this last-mentioned habit is a point on which I can only speak with diffidence. It may now be taken as admitted (Dr. Alcock's verdict in the *Irish Naturalist* for August, 1899, on the subject of Mr. Barrington's captures at Tandragee is accepted by Mr. Millais as final) that this large Bat does not occur in Ireland. In England much attention has been given to its habits¹ by Mr. Charles Oldham, and that gentleman has expressed the opinion that it comes out only *once* in the twenty-four hours, confining its time of flight to the *evening* twilight. Mr. Oldham is careful to admit that he is not certain on the latter point. Assuming his view to be correct, we have in that small group of British Bats that was lately comprised in the single genus *Vesperugo* (or *Pipistrellus*) as many as three different types of flight, viz. :—

1. All-night Flight (Pipistrelle);
2. Double Twilight (Hairy-armed Bat);
3. Single or Evening Twilight (Noctule).

I am afraid, however, that the truth of this singular conclusion is open to some doubt: firstly, because Mr. Oldham does not appear to have looked for his Noctules in the morning; and secondly, because when I once myself visited a haunt of that species before sunrise—at Madeley, in Staffordshire, on the morning of June 27th, 1901—I undoubtedly saw two Noctules flying. But I should add that the particular haunt where *two* were then seen was generally frequented of an evening by

¹ *Zoologist* for February, 1901.

several dozens, if not scores ; so my observations are not at all conclusive as to morning flight being a habit of the species, as it undoubtedly is a habit of the Hairy-armed Bat, both when living in colonies and when living singly¹.

Daubenton's Bat, the fourth and last Irish species to which I have been able to pay attention, belongs to a different genus from any of those yet touched on, so that we have nothing to suggest one rule of flight as more probable for it than another, unless we accept Dr. Dobson's law, according to which, as it has no nasal appendages, it should be a creature of the twilight. This law, however, has already broken down in the case of the Pipistrelle, and it turns out to be equally misleading in the case of Daubenton's Bat. I have not had the good fortune to find any sleeping-places of the latter species, but luckily it can be recognized on the wing with a confidence that would be impossible in the case of the Pipistrelle, and it was by watching it in one of its known haunts near Bray, to which I was introduced by Dr. Alcock, that I was able, after a large number of unsuccessful attempts, to find that Daubenton's Bat is another all-night flying species.

The difficulty in the case of this Bat is not to identify but to see it. Gliding as it does along the surface of the shadowed water, it has to be seen against the most difficult background, and I have often been surprised to find that even in moderate moonlight no trace of its quaint little white-breasted figure flitting up and down the stream was discernible later than an hour and forty minutes after sunset. One night spent in its haunts, however (that of July 21st-22nd, 1900), taught me that as soon as the same degree of light had been restored in the morning, an hour and forty minutes before sunrise, Daubenton's Bat became visible again ; wherever it had been in the meantime, there it was now, passing and re-passing, an inch or two above the surface of the stream, in the same methodical way as when I had lost sight of it in the fading twilight of

¹ Mr. J. Steele Elliott also states in the *Zoologist* for April, 1901, p. 133, that he has on two occasions—in Bedfordshire and Warwickshire—seen *Noctules* flying in the morning. I regret that I overlooked this note when preparing my paper. Mr. Elliott's observations strengthen the suspicion I have expressed above, that double flight may be the regular practice of *Pterygistes noctula* as well as of *P. Leisleri*.

evening. Sometimes I could see as many as three together. Their appearance became less frequent from 3.17 a.m. (forty-four minutes before the time of sunrise), but one example remained in sight until thirty-eight minutes before sunrise—a later period than one would expect from the fact that Daubenton's Bat seldom shows itself in the evening until about fifty minutes after sunset. The further question how this Bat spends the interval of more complete darkness had to be postponed until at last, on one night of beautiful moonlight—it was in the full serenity of the harvest moon (September, 1901)—I found Daubenton's Bat flying freely and plentifully during the fourth, fifth, and sixth hours after sunset, and at the very stroke of midnight. This, added to the morning observations, may, I think, be taken as conclusive that here we have a third case of a Bat which flies all night.

We now see how far from correct is the view so commonly prevalent, that a majority of our Bats are crepuscular. We have examined the ways of four Irish species, all belonging to the group which Dr. Dobson pronounced “crepuscular and matutinal,” and have found that three of them belonging to three different genera—*Plecotus*, *Pipistrellus*, and *Myotis*—fly all night, while only one—representing, I think, we should say, a fourth genus, *Pterygistes*—restricts itself to the period of twilight. There remain three Irish species of which nothing has been found out; but two of them—the Whiskered Bat and Natterer's Bat—belong to the same genus with Daubenton's, which we know to be nocturnal, so it seems the natural thing to suspect that they also share the all-night habit. The other kind whose habit remains unknown is the Lesser Horse-shoe Bat, about which we have absolutely nothing to guide us. Being the only Irish representative of the group with nasal appendages, it ought, on Dr. Dobson's principle, to fly all night; but it is much to be wished that some of our friends in Clare, Kerry, and Galway, where this interesting Bat is found, would bring the matter under the test of observation.

When we know more about the Lesser Horse-shoe Bat's habits of flight, we shall probably be much better able to form opinions as to the use of those peculiar leaf-like appendages which it carries on its nose, and which are so extremely sensitive that nobody doubts they are supplementary in some way

to its powers of sight, though in what way we cannot yet tell. Unless the animal is afflicted with very inferior sight to that of—for instance—the Pipistrelle, it does not need special organs to enable it to fly in the dark ; nor can it be for that purpose that the Long-eared Bat has developed those enormous ears that make it so great a curiosity amongst our mammals. Naturalists have, indeed, supposed this to be the explanation ; but then they did not know that the Pipistrelle and Daubenton's Bat, which have no such appendages, fly equally late with the Bats that have them. For my part, I think the Long-eared Bat's ears can be explained by the nature of the situations in which it flies. This Bat's habit is to glide about among the foliage of trees with its eyes apparently rivetted on the leaves in search of insects at rest ; and while its eyes are thus occupied it naturally wants well-developed "feelers" to enable it to thread its way among the branches without collisions. In fact, many carnivorous animals—Seals, for instance—have been described as using their whiskers in the same way, when stealing on their intended victims, as the Long-eared Bat, in my opinion, uses its ears. However, the feeding habits of the Lesser Horse-shoe Bat in its natural haunts have still to be ascertained, and it would be very rash to start any theory as to what those habits may be until they have been more accurately studied. In the observations I have offered, I hope I have shown that Bats are worth a little watching, and have secrets in their economy which must be found out by watching, and which the most skilful scrutiny of the largest series of dead specimens will not suffice to disclose. It is true, no doubt, that the time available to most of us for this kind of observation is rather limited ; but to those who realise how attractive, not to say exciting, a form of pursuit it may become, opportunities will, every now and then, suggest themselves, and I hope no member of the Dublin Naturalists' Field Club will despise them when they occur.

Ballyhyland, Co. Wexford.

FORAMINIFERA IN IRISH GREENSAND.

BY GEORGE C. GOUGH, A.R.C.SC.(LOND.), F.G.S.

LAST summer, during a visit of the geological section of the Belfast Field Club to Whitehead, I was struck by the suitability of the "Chloritic Sands" there for "floating," and brought home a sample, together with a sample of the "Yellow Sands," in order to examine them for Foraminifera. As far as I can gather there is no reference to the presence of such organisms in these deposits, with the exception of Hume's paper.¹ Here they are referred to as being in the form of glauconitic casts, not specifically recognisable. In the Chloritic Chalk they were also found by him as recognisable casts, the other reference being to a solitary *Flabellina cordata*, accidentally found when dissolving glauconitic marl. By floating I was able to obtain a large number of Foraminifera, and there is no doubt that a thorough examination of these deposits would yield a great number of species. They are preserved in calcium carbonate, and have become very chalky, but can be recognised with a little trouble. Unfortunately I have not sufficient time thoroughly to work them out now, so I am just recording their presence in the hope that someone else will be able to submit them to a thorough examination.

In both the Chloritic Sands and the Yellow Sandstones *Textularia globulosa* and *Globigerina cretacea* are extremely abundant. The following Foraminifera were easily recognised:

CHLORITIC SANDS, WHITEHEAD.

<i>Textularia globulosa</i> , Ehr.	<i>Orbulina</i> ?
<i>Verneuilina</i> , sp.	<i>Planorbulina exsculpta</i> , Rss.
<i>Bulimina</i> , sp.	<i>Truncatulina</i> , sp.
<i>Bolivina obsoleta</i> (Eley.).	<i>Pulvinulina micheliniana</i> , d'Orb.
<i>Globigerina cretacea</i> , d'Orb.	

YELLOW SANDSTONES.

<i>Textularia globulosa</i> , Ehr.	<i>Orbulina</i> ?
<i>Verneuilina</i> , sp.	<i>Truncatulina lobatula</i> (W. & J.).
<i>Globigerina cretacea</i> , d'Orb.	<i>Pulvinulina micheliniana</i> , d'Orb.

Queen's College, Belfast.

¹ *Q.J.G.S.*, vol. liii., 1897.

SOME LEPIDOPTERA FROM CO. FERMANAGH.

BY CHARLES LANGHAM.

THE following list of the scarcer Irish Lepidoptera, not including the Geometræ or the "micros," taken during the seasons of 1902-03 in the neighbourhood of Tempo, Co. Fermanagh, may be of interest to some of your readers. The season of 1902 was very productive of the Noctuæ, and especially so in the case of the Plusias, which were in unusual numbers. The nomenclature is that of South's "List":—

Argynnis paphia.—Numerous.

Melitæa aurinia.—Very abundant; three large colonies in the neighbourhood.

Cœonympha typhon.—Very common on one bog.

Chærocampa elpenor.—Very abundant, flying round the beds of the common yellow flag.

Smerinthus ocellatus.—Several taken in 1902.

Macroglossa bombylifformis.—Fairly abundant.

Ino statices.—Always abundant in one marshy field near Tempo.

Zygæna Ionicæræ.—Common on some of the islands on Lough Erne.

Nudaria mundana.—Especially common in 1902.

Gnophria quadra.—One larva beaten from an oak tree.

G. rubricollis.—Fairly abundant on the beech trunks in the demesne.

Hepialus velleda.—Very common, flying at dusk over a rushy field in the demesne.

H. hectus.—Fairly abundant; taken mostly at dusk sitting on tree trunks and grass stems.

Pœcilocampa populi.—Males abundant; a few females taken at light, and laying their eggs on the white sheets placed behind the lamps.

Cilix glaucata.—A few taken in 1902.

Cerura furcula.—A few cocoons (empty) found on an island on L. Erne.

Pterostoma palpina.—Two specimens taken in 1903, pupa digging.

Thyatira derasa.—Several taken at sugar in 1902.

Cymatophora or.—One taken 26th July, 1902, on an island on L. Erne.

C. duplaris.—Fairly common in 1902.

Acronycta leporina.—One taken in 1902; curiously enough it was taken on the back of one of the servants, who had been for a short walk to the spring well.

A. megacephala.—One taken flying over yellow flags in 1902.

Xylophasla monoglyphæ.—Several extremely dark forms taken at sugar in the seasons both of 1902 and 1903.

X. hepatica.—A few taken at sugar.

- Cerigo matura.**—One taken at flowers of privet.
- Apamea unanims.**—One taken at light by my brother-in-law while staying here in 1902.
- A. ophlogramma.**—One at lime flowers, 1902.
- Miana strigilis.**—Fairly common at sugar, 1902.
- Grammesia trigrammica.**—Several taken at light, and flying over flowers.
- Caradrina alsines.**—Several taken at privet flowers.
- Agrotis saucia.**—A few taken at sugar, 1902.
- Noctua augur.**—Generally fairly common most seasons at sugar.
- Amphipyra pyramidea.**—Common at sugar.
- Mania maura.**—Scarce, but two or three taken in most seasons.
- Panolis pini perda.**—One in 1902 at sugar.
- Pachnobia rubricosa.**—Fairly common on the willows on a bog.
- Tænlocampa gothica.**—A few nice varieties taken in 1903 on the bogs.
- T. gracilis.**—Fairly numerous, especially on the willows on the bogs.
- T. munda.**—Two taken in 1903, by pupa digging.
- Calymnia trapezina.**—One taken in 1902.
- Aplecta prasina.**—The larvæ very common on low-growing plants in March, 1903.
- Hadena glauca.**—One at light in 1902.
- Xylina socia.**—Fairly common at ivy flowers.
- Habrostola triplasia.**—Fairly common.
- H. tripartita.**—Very common in 1902.
- Plusia chrysitis.**—Very abundant in 1902. Several with the unbroken median brown band.
- P. bractea.**—In 1902 I took forty-seven specimens, mostly fresh, flying or feeding at yellow flag, sweetwilliam, or martagon lilies. These three flowers are the very best resorts for the plusias in this locality, far better I find than honeysuckle.
- P. festucae.**—In clouds on the yellow flag, and afterwards on garden irises, sweetwilliams, and lilies, in 1902; fairly abundant in 1903.
- P. iota.**—Fairly numerous at sweetwilliam and lilies in 1902 (one nice pink variety taken).
- P. pulchrina.**—Very abundant both in 1902 and 1903 at the flowers of the yellow flag, sweetwilliam, and lilies, also on rose campion.
- P. gamma.**—Fairly numerous, though in nothing like such abundance as *P. festucae* or *P. pulchrina*.
- P. interrogationis.**—Abundant at sweetwilliam in 1902, and fairly numerous in 1903.
- Heliothis peltigera.**—One at privet flowers in 1902.
- Chariclea umbra.**—Two at privet flowers in 1902.
- Euclidia glyphica.**—Common in restricted localities on the shores and islands of L. Erne.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four Jerboas from Sir Frederick Shaw, a Crested Grebe from Mr. W. P. H. Vaughan, a Muscovy Duck, a Kestrel, twelve Chaffinches, four Greenfinches, and a Goldfinch from Mr. W. W. Despard; an African Owl from Capt. Cassellis, a Curlew from Mr. R. Warren, and a pair of Guinea-fowl from Mr. E. Carton. Many new Monkeys, a Bear, a pair of Racoons, some Marmosets and Pelicans are on their way from Antwerp, while one of the young Lions lately born in Dublin has been sent to Germany. The Council has decided to erect the proposed new open-air aviary on the far side of the lake.

DUBLIN MICROSCOPICAL CLUB.

MARCH 8.—The Club met at Leinster House.

F. W. MOORE exhibited *Dactylella implexa*. This fungus was found covering the roots of some Apple trees, and was supposed to have caused the roots to decay. However, the species is purely saprophytic, and on enquiry it was found that the injury to the roots had been caused by frost.

W. F. GUNN exhibited living specimens of a small Nematode worm found in decayed Potatoes. The species was not determined, but it appears to be very frequent in potatoes, in which the decay is caused or accompanied by liquifying bacteria. In the potatoes examined the process of decay appeared to be as follows:—The tubers are first attacked by a fungus (*Fusarium Solani*) which disorganises and kills the tissues, which are then seized on by putrefactive bacteria. These organisms soon reduce the substance of the tuber to a semi-fluid glairy mass, providing the moist condition necessary for the existence of the worms.

D. M'ARDLE exhibited, for the REV. CANON H. W. LETT, of Loughbrickland, Co. Down, specimens of *Adelanthus dugortensis*, Douin and Lett, a new species of Liverwort from Achill, described and figured in the *Irish Naturalist*, vol. xiii., 1904, pp. 157-8, pl. 2. Canon Lett also sent for exhibition specimens of *Codonia Ralfsii* (Wilson) whose capsules, ripened in May, appear when the little lettuce-like frond of the previous season has almost entirely withered away; they are about the size of turnip seed, and are raised just above the sand, so that one has to lie down to discover them. A few collected by the exhibitor in May, 1904, among the sand dunes at Magilligan, Co. Londonderry, were grown on sand, in pans $3\frac{1}{2}$ inches across, where their spores were shed, with the result, in the following November, of a crop of 70 nice plants. The tissue of the capsule breaks up, when ripe, longitudinally and irregularly. It is composed of two kinds of cells, some being oblong, very thin, membranous, and hyaline; others very narrow, full of brown pigment, encircling the hyaline cells or connecting them with each other.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 4.—Professor SYMINGTON, F.R.S. (President) in the chair. JOHN HORNER read a paper on "Russia, its People and Politics," after which E. J. E'KEAN read a paper on "Some Irish Ghosts."

BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 18.—BOTANICAL SECTION.—Rev. C. H. WADDELL, B.D., delivered the second of a series of lectures on "Twigs and what may be learned from them."

MARCH 21.—The President (W. J. FENNELL, M.R.I.A.) in the chair. A very large audience assembled to hear a lecture on "Forests, Wild and Cultivated," by AUGUSTINE HENRY, M.A., F.L.S., L.R.C.P. (Ed.). At the commencement of the proceedings the Vice-President (Robert Patterson, M.R.I.A.) brought before the notice of the Club the interesting fact that during the previous week three members of the Club had been elected members of the Royal Irish Academy, and he moved the following resolution:—"That the hearty congratulations of the Club be conveyed to our fellow-members, Major Berry, Messrs. W. J. Fennell, and R. Welch, who have had the distinguished honour of being elected members of the Royal Irish Academy." The motion was carried by acclamation. Mr. Patterson then presented Robert Welch with his certificate of Life Membership of the Academy, which had been subscribed for by twenty-five members of the Club.

Dr. HENRY then read his paper, which dealt with forest vegetation in all parts of the world. In the discussion which ensued, the Chairman, F. J. Bigger, R. Welch, W. H. Patterson, and R. M. Young took part, and a vote of thanks to the lecturer was passed.

The Chairman mentioned that a new Field Club had been started in Tyrone, and was sure the members of the Belfast Field Club would do all in their power to further the success of the new organisation.

Five new members (one being Mr. Deane, the newly-appointed Curator of the Municipal Museum and Art Gallery) were elected.

MARCH 22.—The President (W. J. FENNELL, M.R.I.A.) in the chair. GEORGE DONALDSON read a paper on the "Marine Shells of our District." The lecturer illustrated his remarks by a large array of specimens kindly lent by the Museum authorities for the purpose.

MARCH 29.—The concluding meeting of the winter session was held in the Club's room at the Museum in College Square—the President, W. J. FENNELL, M.R.I.A., presiding. There was a large attendance. R. WELCH, M.R.I.A. read a paper on the drift survey of the Dublin, Belfast, and Cork areas, with special reference to the photographs taken to illustrate the geological Memoirs which describe the areas mapped. All the photographs taken were exhibited, and the more interesting ones in each area pointed out. Among these were the dry gap in the Dublin

hills known as the Dingle, the sections in the Greenhills esker, and the crushed slates at Howth Head; in the Belfast area, sections in the deposits of the ancient "Lake Belfast," and the volcanic sills at Scrabo hill; in Cork, submerged pre-glacial river gorges, which cut across the Old Red Sandstone ridges and the pre-glacial raised beach. Some recent geological work in other parts of Ireland was also mentioned and partly illustrated. The lecture was followed by a good discussion.

APRIL, 11.—ANNUAL MEETING.—The President in the chair.

JOSEPH WRIGHT, F.G.S., read a paper on "Perforations in Primary Limestone from North Donegal." He said:—While spending a few weeks last September near the village of Dunfanaghy, North Donegal, his attention was drawn by one of his party to a great number of peculiar circular perforations in the primary limestone on the shore of Lough Sessiagh. The limestone in which those occurred was in situ, and sloped down at a very slight angle to the margin of the lake. The perforations, which were hemispherical in shape, varied somewhat in size, the largest and best-preserved being one inch in depth. As he had never seen perforations like these before, his curiosity was aroused as to the manner of their formation. The only signs of life on the rock were a few small rounded clumps of moss, in size and shape the almost exact counterpart of the surrounding holes. As the moss would naturally accumulate moisture on the spot in which it grew, this moisture would act on the underlying limestone and gradually wear it away. Once a cavity was formed, even should the moss die, rain water would enlarge and deepen it considerably in the course of time. Since his return a member of the Club had drawn his attention to various references on this subject in the first volume of the *Irish Naturalist*. Three explanations were given there, viz.:—The action of water, boring by the *Pholas* shell when the land was submerged, and excavations by our common land shell, *Helix aspersa*. Whatever might have been the origin of the perforations mentioned in the *Irish Naturalist*, he thought those seen at Lough Sessiagh, in Donegal, were undoubtedly produced in the manner he had described. Mr. Wright handed round specimens of this limestone, showing the perforations, and a discussion ensued, in which William Gray and R. Welch took part.

E. J. M'KEAN, B.A., B.L., then read a paper on "Folklore." The Chairman, William Gray, and A. Milligan took part in the discussion.

The President then called on the Hon. Secretary (N. H. Foster, M.B.O.U.) to read the annual report, which again records increased membership, and shows the Club to be full of vigour.

The statement of accounts was read by the Treasurer (W. H. Phillips), and the reports of the botanical and geological sections by the Sectional Secretaries (A. Milligan and G. C. Gough). George Donaldson read the Librarian's report, and R. Welch the report of the Sub-Committee who adjudicated on collections submitted in competition for prizes offered by the Club. The reports were adopted.

The office-bearers for 1905-6 were elected as follows:—President, W. H. Phillips; Vice-President, Robert Patterson; Treasurer, W. H. Phillips; Librarian, L. J. S. Jackson; Secretaries, G. C. Gough and

George Donaldson; Committee, Robert Bell, W. J. Fennell, N. H. Foster, W. H. Gallway, W. A. Green, Alex. Milligan, H. L. Orr, James Orr, R. Welch, Prof. Gregg Wilson. Two new members were elected.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 18.—EXCURSION TO ZOOLOGICAL GARDENS.—A large attendance of members and visitors assembled before the Superintendent's House in the Gardens. Here they were met by Dr. R. F. Scharff, Hon. Sec. of the Royal Zoological Society of Ireland, who acted as conductor during the afternoon, and took the party round the various houses. Among the birds, the Emus and Rheas, recently presented by the Duke of Bedford, attracted much attention. After having tea in the Haughton House the party broke up.

MARCH 21.—R. M. BARRINGTON, LL.B., in the chair.

C. B. MOFFAT, B.A. (Vice-President), read a paper on "The Duration of Flight among Bats." This paper, which is published in full on p. 97 *supra*, was discussed by the Chairman, E. Williams, and F. O'B. Ellison. The following exhibits were displayed:—J. DUFFY, Carboniferous Fossils from Castleisland, Co. Cork, etc. J. N. HALBERT, Nest of South American Wasp (*Chartergus*). J. CRAMPTON WALKER, Carboniferous Fossils from St. Doulough's, Co. Dublin. EDWARD WILLIAMS, specimen of Iceland Falcon (*Falco islandus*), from Co. Donegal.

The following were elected members of the Club—Mrs. F. W. Burbidge, F. G. Bell, J. Crampton Walker.

APRIL 8.—EXCURSION TO LUCAN.—A large number of members and visitors assembled at Parkgate-street in time for the 2 p.m. electric tram for Lucan. On reaching Lucan the party proceeded up the northern bank of the Liffey, under the guidance of Miss M. C. Knowles. The attention of members was directed to the botany of the district, especially to the buds of the many varieties of trees which clothe the banks of the river. On reaching Leixlip return was made along the southern bank. After tea at the Spa Hotel the party returned to Dublin by the 7.10 p.m. tram. Among the rarer plants noted were *Scrophularia umbrosa*, *Orobanche Hederæ*, and *Lamium Galeobdolon*.

APRIL 11.—C. B. MOFFAT, B.A. (Vice-President), in the chair. Dr. C. A. MATLEY displayed a number of lantern slides from the British Association Geological Series. DAVID HOUSTON discussed the flowers and buds collected on the excursion held on April 8. Miss M. C. Knowles, Miss E. M'Intosh, B.A., and I. Swain, B.A., joined in the discussion. The Hon. Secs. presented the report for 1904 of the corresponding societies of the British Association. The following exhibits were displayed during the evening:—W. F. GUNN—Examples of diverse specific coloration in the seeds of *Phaseolus* and other plants, and a species of *Primula* with enlarged foliaceous calyx; J. CRAMPTON WALKER—Nest of Weaver Bird; EDWARD WILLIAMS—Specimen of Night-Heron, *Nycticorax griseus*, from Co. Dublin. Miss Sybil M'Comas, Rev. John Pim, and Mrs. Pim, were elected members. I. Swain, B.A., was elected an associate member.

REVIEW.

SOME NEW IRISH CRUSTACEA.

The Schizopodous Crustacea of the North-east Atlantic Slope. By E. W. L. HOLT and W. M. TATTERSALL, B.Sc.

On the Genus *Nematobrachion*. By W. T. CALMAN, D.Sc.
Appendix to Part ii. of the Report on the Sea and Inland Fisheries of Ireland, 1902-1903. No. iv. Dublin, 1905.

The report on the scientific investigations (No. iv.) of the Fisheries Branch of the Department of Agriculture and Technical Instruction for Ireland again contains some papers of considerable faunistic interest. The subject of the first paper embraces a much larger area than what has been described as the "Irish marine area."

It is worthy of note that those naturalists who joined in the work of the Royal Irish Academy Fauna and Flora Committee in their endeavour to produce complete and up-to-date lists of the various groups of Irish animals and plants showing the range of the Irish species, have agreed to limit their sphere of action to the terrestrial area of Ireland, and to a certain distance beyond, so as to include the forms inhabiting the sea. They could not logically do otherwise. They also agreed to call this limited area of their sphere of action the "Irish" area, for if an author speaks of a marine crustacean as "Irish" or as an addition to the Irish list, he thereby implies that he has arrived at some conclusion that there is an "Irish marine area," and that it has some definite boundaries.

The authors of the first report seem to be rather afraid to commit themselves on this point, for they inform us in a foot-note, p. 131, that they use the term "British and Irish" in a compound sense and not in recognition of a separate Irish marine area. Surely the action of the Irish Fisheries Branch must be limited to a certain area! Would it not be well therefore for the members of that Branch to recognise a separate Irish marine area? However the authors acknowledge, p. 133, that the British and Irish area has its limits, and that there is an "Irish list," so that they do recognise the claims of certain creatures to be labelled as "Irish," which is some consolation.

But the object of this note is not to criticise the paper adversely. The descriptions of the new species—there are several—are carefully drawn up and accompanied by excellent drawings of the species. It would be useful, however, to Irish zoologists to be informed where the type specimens are to be preserved for future reference. The text is worthy of a better quality of paper and printing than that bestowed upon it by the authorities in charge.

The second paper of the report by Dr. Calman deals with the single genus *Nematobrachion*, which was originally described by that author under the name of *Nematodactylus*. The latter name had unfortunately been previously used for a genus of fishes, and had to be withdrawn.

The species referred to *N. boops* was first discovered during the Royal Irish Academy Expedition, 1888, and described in the *Transactions R.I.A.*, 1896, from an imperfect specimen. Mr. Holt having handed to Dr. Calman perfect ones from the Bay of Biscay, the author is enabled to extend and correct the account previously given.

R. F. S.

NEWS GLEANINGS.

New Royal Irish Academicians.

Of the twelve new members (the maximum annual number permitted by the Bye-laws) who were elected into the Royal Irish Academy on March 16, seven are men of science—five of them being resident in Dublin, one in Belfast, and one in Liverpool. Their names are—Prof. A. W. Conway, M.A., F.R.U.I.; George Fletcher, S. B. Kelleher, M.A., F.T.C.D.; Prof. J. A. McClelland, M.A., F.R.U.I.; Major Ronald Ross, C.B., F.R.S., Sc.D., F.R.C.S.; Robert Welch, and Prof. Sydney Young, D.Sc., F.R.S.

The Belfast Field Club's Proceedings.

Part iii., of volume v., dealing with the session ending March, 1904, has been issued. The number contains the usual accounts of summer excursions, and abstracts of papers read at the winter meetings. An interesting feature is a two-page plate, illustrating a paper by the President (W. J. Fennell, M.R.I.A.), on "The Club's Builders," and giving portraits of sixteen of the members who have taken a leading part in the conduct of the Club during the forty-two years of its existence.

Approval of Sheep Dips for Sheep Scab.

Under the Sheep-scab Orders made on the 25th March, 1905, by the Department of Agriculture and Technical Instruction for Ireland, the use of sheep-dips approved by the Department is required.

The Sheep-scab (Ireland) Order of 1905 contains three prescriptions for dips which the Department have approved after experimental trials. The Department are prepared to receive applications from manufacturers of any sheep dip for their approval of its use for Sheep Scab, and have arranged that any analytical examination necessary to verify the stated composition of the dips submitted to them shall be made at the Government Laboratory in London.

Forms of application for the approval of a dip may be obtained from

The Secretary,

Department of Agriculture and Technical

Instruction for Ireland,

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NOTES.

BOTANY.

Vegetation on Brickwork in Cork.

In the February number last year, Mr. W. H. Patterson called attention to the contrast between the absolutely bare walls of the old bottle-works cone at Belfast and those of a similar old cone at Cork, also brick-built, but now covered with luxuriant vegetation. I have been in Cork since then, and noticed that old ruins, and indeed any old walls built with brick or limestone, had a luxuriant crop of the Wall Pellitory (*Parietaria officinalis*), a plant that flourishes on the limestone walls of many old Irish abbeys, castles, etc., this being especially the case in the west or south. At Cork I only noticed the Pellitory; it was thick also on the quay walls at Patrick's Bridge, bringing a breath of the country into the heart of the city. Mr. R. A. Phillips tells me however that a much more conspicuous plant on the old cone is *Senecio squalidus*, which gives it quite a yellow appearance, markedly so in early summer and early autumn. Plants flourish more, he thinks, on old walls and ruins about Cork than elsewhere in Ireland, especially the *Senecio* mentioned and other aliens, such as *Linaria Cymbalaria*, *Centranthus ruber*, *Erinus alpinus*, and *Hypericum hircinum*. In the north-east the Pellitory is not uncommon on some old walls, but not with the luxuriant growth that the Conference party observed on Sligo Abbey, and on the bridge at the hotels there last July.

Belfast.

R. WELCH.

The Distribution of *Cochlearia officinalis* and *C. anglica*.

My experience during several years past of the distribution of these two species in the South of Ireland leads me to believe that the first is not so common or the last so rare as the information given in various works on Irish botany would seem to show, and that the two have been more or less confused. Taking the County of Cork as an example of what I mean, we find that Drummond (1819) gives only one locality for *C. officinalis*, i.e., the top of Hungry Hill; Power (1845) records it as common about Cork and the mouths of rivers; and Allin (1883) states, without giving localities, that it is common on muddy shores.

C. anglica is recorded by Drummond from Cork and Bantry, and Power gives four additional stations, but throws some doubt on the plant's existence near Cork city, while Allin states that all these stations belong almost certainly to *C. officinalis*.

My own experience, having examined every likely spot about Cork Harbour and the river Lee, from its estuary to its tidal limit, also the Blackwater and Ilen estuaries, is that the plant of our muddy shores and banks is *C. anglica*, var. *Hortii*. I have also seen the same plant in estuaries in Counties Waterford, Kilkenny, Limerick, Clare, and Wexford, and it has been found near Kenmare, Co. Kerry, by Dr. Scully.

C. officinalis I have seen growing only on rocks and cliffs near the open sea, never so frequently nor so abundantly as to be called common.

As these notes refer only to portions of the southern half of Ireland, perhaps botanists in other parts of the country having opportunities during April and May, when both species are in bloom and fruit, would examine the maritime and tidal districts within their reach, and state, as their experience (1) if typical *C. officinalis* is really common on our coasts, and (2) if it, or *C. anglica*, var. *Hortii*, is the plant of the muddy shores of our estuaries and tidal rivers, or if both species grow together in these situations.

R. A. PHILLIPS.

Cork.

ZOOLOGY.

Greenland Falcon in Co. Donegal.

I am informed by Mr. D. C. Campbell that on March 21st a Greenland Falcon (*Falco candicans*) was trapped at Horn Head, near Dunfanaghy. It is an immature female, and measured 1 ft. 11 in. from beak to tail, the wing expanse being 4 ft. 3 in. This is the eleventh record for Donegal, being one-third of the total Irish records.

ROBERT PATTERSON.

Holywood, Co. Down.

Corncrakes in Winter.

A Corncrake (*Crex pratensis*) was shot near Lurgan on 31st January, 1905. The man who shot it was attracted by the sound of the bird's "craking," otherwise its presence would not have been detected. This seems a most unusual occurrence, and I can find no reference to the well-known sound having been heard in mid-winter in any of the authorities I have consulted. Again, two gentlemen out walking in the neighbourhood of Belfast on 19th February observed a Corncrake running across the road a few feet in front of them. It disappeared into a thicket of brambles. It will be noted that neither of these birds was hibernating.

ROBERT PATTERSON.

Holywood, Co. Down.

Common Bittern in Co. Wexford.

A fine specimen of this irregular visitor to our shores was shot last November near Curracloe, Wexford, and given to W. J. O'Neill, Esq., Kilmacoe, who had it mounted by Messrs. Williams of Dublin. Mr. O'Neill heard it previously booming near his house.

J. H. JOHNSTON.

Wexford.

The last wild Red Deer, Co. Donegal.

Some years ago, while we were looking across a wild stretch of country towards the Lough Salt mountains in N.W. Donegal, Mr. W. F. de Vismes Kane told me the following history. I had forgotten the details, but hearing lately that it would be of interest, I wrote to Mr. Kane, and he writes me as follows from Nice, S. France:—

“It must have been about the year 1862 that I was salmon fishing in the Lackagh, and Mr. Stewart’s (of Ards) water keeper, Edward Gallagher (if I do not mistake a name that was once familiar to me) attended me. The salmon were then more keen at taking the fly than they became afterwards, and he was a sure hand with the gaff. He had a very old bedridden father—he might have been 90 years old from his looks—who told many stories about that part of the country. He said *his* father, a very old man, told him that when he first came to those parts the country was very sparsely inhabited, and to see any of his neighbours he had to travel over the hills and bogs seven to ten miles. The Lackagh was then so full of salmon that it was easy to gaff as many as one wanted, in the season, and the rocky banks (“*Lack*”agh) were full of wild cats, who fed on the fish killed by the otters, and left with only a bite or two taken out of them. Also that there were still plenty of deer in the mountains still surviving, and that very occasionally word was sent round that part of Donegal to appoint a day and have an organised hunt. Certain passes were known and appointed toward which the whole available beaters drove the deer: and a palisade on each side was repaired, which narrowed little by little as it approached a bog. Here right across the mouth of the palisaded route was dug a very deep trench in the bog, at the bottom of which were upright sharp stakes, and all this was lightly covered with heather. This story carries one back I should say to the beginning of the 18th century.

“The manner in which the last deer was killed is as follows, and happened quite in the old man’s lifetime, if I recollect aright.

“There was a single surviving stag frequenting Glenveigh. Many times he was hunted, but never could be shot. It was observed that whenever the chase took a certain direction he evaded his pursuers, and those lying in wait, by making for a path which crossed the precipitous face of a mountain (probably one of those on the far side of the lake from the present castle). This path at one place was broken off, and the stag jumped the gap, and followed the track on the other side. On one occasion an old woman, hearing the shouting, concluded that the quarry was once again trying this method of escape. She was on the far side of the gap, and so taking off her red petticoat, she placed it on the stone on the edge where the deer would alight when he took his usual leap. The animal, coming to the off-take, swerved in his jump to avoid the unwonted and surprising coloured garment. He slipped on alighting, and could not retrieve his footing, but fell down and was killed.”

R. WELCH.

Belfast.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
" " 6	Charlock Spraying.
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BOTTLE-NOSED DOLPHIN (*Tursiops tursio*),
from Dublin Bay.

One-twentieth natural size.

C. McNab, del.

BOTTLE-NOSED DOLPHINS IN DUBLIN BAY.

BY R. F. SCHARFF, PH.D., F.L.S.

(PLATE 4.)

WHEN I wrote a short account on the Irish Cetacea¹ five years ago, I mentioned (p. 90) that the only certain record of the Bottle-nosed Dolphin (*Tursiops tursio*) having occurred in Irish waters was that mentioned by Bell, according to whom a specimen had been taken on the south coast in 1829. Mr. McCabe, of the South City Markets, in Dublin, informed me, on the 29th April last, that two young whales had been captured the night before in salmon nets set near the mouth of the River Liffey. Mr. Nichols and I went to examine them at once, and identified them as Bottle-nosed Dolphins; clearly the species is of great rarity on the Irish coast.

Both specimens were females, one being 10 feet 6 inches long, and the other a little smaller. They were of a uniformly dark slaty-grey colour above, including the flippers, and underneath of a dirty white. The white colour extended in a narrow strip along about half of the upper jaw, while the anterior portion of the lower jaw was grey. There were forty-two teeth in the lower and forty-six in the upper jaw.

I herewith give a figure of one of the specimens, and may point out at the same time that it differs to some extent from the only other drawing published of an Irish Bottle-nosed Dolphin. The late Dr. Gray had in his possession a drawing made by Robert Templeton of the Irish specimen obtained in 1829, and referred to above. This he reproduced in his paper.² To judge from this drawing, which evidently represents a Bottle-nosed Dolphin, it would seem as if the extent to which the white colour invades the head region is variable. The head is almost entirely white in this specimen. Then, again, in Prof. Flower's figure of the same species,³ the whole of the lower jaw is coloured white.

¹ *Irish Naturalist*, vol ix., 1900, pp. 83-91.

² *Annals of Natural History*, vol. xvii., 1846.

³ *Trans. Zool. Soc. London*, vol. xi., 1885, plate 1, fig. 2.

The Bottle nosed Dolphin resembles the Bottle-nosed Whale in shape, and both belong to the great group of toothed whales, but whereas the latter has only a single pair of teeth in the lower jaw, the former, as we have noticed, possesses a very large number of conical teeth. The distribution of the Bottle-nosed Dolphin is world wide. The Common Dolphin differs from the Bottle-nosed Dolphin in having a much longer beak, smaller and more numerous teeth, while it is unusually variegated in colour for a whale.

It may be of interest to add that Mr. M'Cabe has kindly presented the larger of the specimens referred to to our National Collection; the other has gone to an English museum.

The Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include twelve Chaffinches, four Greenfinches, a Goldfinch, eight Redpolls, and three Hooded Crows from Mr. W. W. Despard; and a Badger from Mr. O'Brien. Many animals have been lately acquired by exchange or purchase, including a number of Monkeys and Marmosets, two Dwarf Lemurs, a pair of Black Porcupines, a Bear, and a pair of Racoons, two Ural Owls, a Marabout Stork, and some Pelicans. Three Lion cubs have been born in the Gardens, and four young Lions have been sold and exported to Germany.

The well-deserved honour of an Honorary Vice-Presidency has been conferred on Mr. W. E. Peebles after twenty-five consecutive years' service on the Council. The vacancy thus created has been filled by the co-option of Dr. E. M'Dowall Cosgrave.

DUBLIN MICROSCOPICAL CLUB.

APRIL 12.—The Club met at Leinster House. Dr. R. F. SCHARFF, President, in the chair.

J. N. HALBERT exhibited an uncommon fresh-water mite—*Torrenticola anomala* (Koch)—found in the River Nore, near Thomastown, Co. Kilkenny. The species is very local, occurring in rivers and streams in various parts of Ireland, notably in the Flesk (Killarney), in the Blackwater (Lismore), and in the Tolka, near Finglas, Co. Dublin. It has also been recorded from Scotland.

F. W. MOORE exhibited *Bulbophyllum tremulum*, Wight. This is a very scarce and interesting orchid, a native of India, belonging to the small group in which the labellum bears numerous hairs. In the present instance, a heavy fringe of hairs hangs downwards from the labellum, resembling a beard, these hairs being flat, strap-shaped, and in colour dull red. Slight breaths of air cause these hairs to vibrate, and a strong breeze, sufficient slightly to shake the inflorescence, causes the labellum of each flower, with the attached hairs, to oscillate.

Prof. G. H. CARPENTER showed *Lohmannia insignis*, an Oribatid mite, from Tibbradden, Co. Dublin, recently described as a new species by Prof. Berlese (*Redia*, vol. ii., 1904, pp. 23-4, pl. ii., fig. 41). This mite occurred in numbers, and had proved injurious to bean seedlings in the garden at Tibbradden House, where it was detected by Mr. T. Bell.

D. M'ARDLE exhibited *Peziza granulata*, Bull, a fungus which occurs in considerable quantity on cow-dung, and presents the appearance of scattered grains or seeds. When very young the cup is round; it afterwards expands flatly, is of a fulvous orange colour, and is composed of cylindrical asci containing eight elliptical sporidia, with stout linear paraphyses, club-shaped at the apex, which is full of orange-red granules; these present a beautiful object under the microscope. It is common in Co. Dublin. There is an excellent figure of the plant in Cooke's "Micrographia," page 34. plate 15, fig. 59.

CORK NATURALISTS' FIELD CLUB.

APRIL 11.—ANNUAL MEETING.—The annual meeting was held in the Club rooms, which are now open to members every evening, except Thursday, from 7 to 9.45 o'clock.

The following reports were read and adopted, the treasurer showing a balance in hand of over £9.

THIRTEENTH ANNUAL REPORT—SESSION 1904-5.—The membership of the Club is now fifty-four, including eleven hon. members, as against fifty-eight last year, and also we have eighteen junior members. During the past session, a special effort was made to resuscitate the excursions, which had fallen into abeyance during the Exhibition years. A full programme was arranged, and your secretary issued a special circular, stating that, as far as possible, he would personally superintend them. The result has not come up to our expectations, for while the excursions were fairly attended, many more members should have come, and the practical results might have been more encouraging.

At our last annual meeting our rules were altered so as to facilitate the formation of a junior branch at the nominal subscription of 1s.; this resulted in about twenty joining, principally from the High School; but though several prizes were offered, none were competed for, which is much to be regretted, as it was thought this would encourage collecting and nature-study.

The following series of excursions was arranged, all of which, except that to Innishannon, were held; the Innishannon one, fixed for August Bank Holiday, having to be given up owing to wet weather:—

April 4.—Raffeen to Carrigaline, through a most picturesque and interesting piece of country. April 23.—Lota Lodge, by kind permission of A. F. Sharman Crawford, Esq., J.P., rail to Glanmire and walk back by Bennett's Bog. This was the most largely attended of all, about thirty, chiefly the junior branch, going. May 7.—Waterfall to Ballinacollig. May 14.—Drive to Carrignavar and home by Templemichael. May 28.—Rochestown to Monkstown. June 4.—Douglas district. June 8.—Blarney line, getting out at junction and walking back to Leemount; some of the party walked back to Cork. June 25.—Little Island; conducted by Mr. Farrington. August 25.—Kinsale. The weather kept some away, but those who went had a most interesting dredging excursion in the harbour, under Mr. Rohu's guidance, and obtained some interesting marine specimens. September 10.—Raffeen and walk to Currabinny, where the party were kindly entertained to tea by Mrs. John Pickering. September 17.—Rail to Blarney, and walk home by the old road.

The 4th Triennial Conference and excursion under the Field Club Union was held at Sligo, and well attended, though only one of our members, Mr. Charles Baker, was able to go from Cork. An account of this was given as a joint lecture with the Cork Literary and Scientific Society, by R. Lloyd Praeger; it was most interesting, and was fully illustrated by magnificent views taken by R. Welch. The only other lecture so far was on "The Relation of Art to Nature," by your secretary, which was also, by request, given under the same joint auspices.

Mr. Praeger expressed the hope that the 5th Field Club Union Conference of 1907 should be held in Cork. This we hope may be done, as it would prove a great stimulus to local study; but to make it a success, we need to gird up our loins and make much more effort than has been done to ensure practical results.

The most important event of the year is the joining of our Club with the Historical and Archæological Society, and the Scientific Association, in taking the reading-room of the Cork library for the society's use, five evenings in the week from 7 to 10 o'clock. This will take all our funds, and unless it results in greatly increasing the numbers of our membership, the interest in the Club cannot be continued beyond the year. That such may not be, is our sincere hope, after thirteen years of existence, and we urge upon all our members to take more interest in the various meetings, and thus contribute towards their success.

The following officers were elected for the ensuing session:—

President—W. Humble Johnson. Vice-Presidents—Prof. M. Hartog, D.Sc.; Miss Martin, T. Farrington, J. L. Copeman, R. A. Phillips, J. H. Bennett, H. H. Lund. Hon. Treasurer—W. B. Lacy. Hon. Secretary and Curator—Charles Baker. Committee—Miss Porter, F. R. Rohu, W. Miller, J. Noonan, C. Peyton.

BIRDS MET WITH ON CONNAUGHT LAKES.

BY R. J. USSHER.

I HAVE drawn attention in this magazine to the use made of the Shannon and its lakes by migrants and wandering sea-birds when migrating north and south, but another easy route is afforded by the great lakes, Corrib, Mask, and Conn, by which wild fowl can pass from Killala Bay to Galway Bay, and thus cut off the dangerous circuit round the coasts of Mayo and Connemara.

Mr. Warren lives at the northern end of this short cut, and has for over half a century recorded observations, many of which illustrate this migration route. Thus, in October, 1851, and again in October, 1862, remarkable numbers of Skuas, of two species, were seen entering from Killala Bay, and on the latter occasion these birds were immediately afterwards observed in numbers on Tralee Bay.

My own acquaintance with this part of Ireland is limited to summer, so that the species which breed there are more familiar to me than migrants, and I will relate some of my observations made in May and June in different years. Leaving Galway by boat one has to traverse the River Corrib for three miles before reaching the lake, passing through the cut of Menlough. This channel leads through a wide extent of rough, sedgy ground, once a swamp. Here many breeding Curlews performed their favourite exploit of ascending with rapid strokes, and then projecting themselves, with wings stretched out rigidly, and descending like a parachute. Redshanks and Dunlins, which also breed on this lake, perform the same manœuvre in the nuptial season.

Lough Corrib is about thirty miles in length, and has two broad, deep expansions—the rest being a flooded tract of limestone crag, with rocky points and masses of all sizes, either projecting from the surface or barely submerged. Much of this extraordinary basin is so dangerous to navigate that the feathered inhabitants nest undisturbed except by winged enemies. Of these the Marsh Harrier, once a widespread resident, still lingers on the lonely bogs beside the lake, where I have watched it sailing, soaring, and wheeling

at no great height; its wings are often held slanting upwards. The Hen Harrier was also common up to 1872, previously to which it nested on several of the islands towards the north end, but these were sought out and the birds shot. Of all birds of prey the Harriers are the most easy to kill, from their low, deliberate flight.

Among the birds that people the numerous islands of Lough Corrib, the Arctic Tern is most in evidence. Its colonies are dispersed through the central portion of the lake, where a boat is ever in danger of having its bottom pierced by a sunken point of limestone. I have found some nests of Common Tern among those of the Arctic. While both species have been proved by Mr. Warren to breed on Loughs Mask and Carra, I understand that the proportion of *S. fluviatilis* is larger on those lakes. At a point in Lough Corrib, fully eight miles from the Port of Galway, the nearest sea, I saw a pair of Little Terns fishing near an island, and they seemed to be quite at home there. I could see their white foreheads, as they were close to me.

The Black-headed Gull has several colonies on the islands of these lakes, but a more remarkable member of this family, the Lesser Black-headed Gull, breeds on many islands. I have seen as many as four pairs at their nests on adjoining islets or rocks at a shallow, dangerous part of Lough Corrib, where the site chosen was frequently under or in the midst of a willow or other small bush that was open enough for their large nest. Elsewhere on this lake, and on Lough Mask, where islands are largely formed of huge bare boulders, the single nest is placed among these; but on one island that I have not visited, Mr. Warren found twenty nests of the Lesser Black-backed Gull. He also found some scattered nests of the Common Gull on the points and rocky islets of Lough Mask, which seems to be the most inland breeding resort of this bird in Ireland. It also nests on Lough Conn and Lough Cullin, and on an island in the latter lake about thirty pairs were breeding in 1894 (Warren).

In Ireland the Common Gull chiefly frequents in the nuptial season the small islets of freshwater lakes near the western coasts of Donegal, Mayo, and Galway, and the fact that it breeds on some of the great lakes of central Connaught

corroborates the semi-marine character of their bird-life. But, to return to Lough Corrib; nowhere have I seen more Mergansers, sometimes in pairs, sometimes in little bands. In June the females may be found hatching on the islands of all these Connaught lakes, and a favourite nesting-site is in a rank bed of Meadow-sweet, through which the bird makes a tortuous pass from the shore. As the Merganser feeds on fish, it is not incommoded by the rocky nature of the bottom; but this does not seem to suit the Great Crested Grebe, a bird that I failed to meet with on the larger lakes. I met with it, however, on Lough Hackett, a small lake near Headford, which was muddy, and grew flags or rushes.

The islands of Lough Corrib are much resorted to by the Common Sandpiper, and Dunlins are to be seen sometimes in unaccountable little flocks at the height of the breeding-season, sometimes in pairs that seem to have nests.

The Cormorant is to be seen in all directions, one prominent rock, which formed a favourite perch, being well whitewashed. A small colony of Cormorants used to nest (as Mr. Warren informs us) on the ivy-covered walls of an isolated castle in Lough Mask, until storms stripped off the ivy. I have described elsewhere¹ considerable colonies of Cormorants that nest on the trees of lake-islands in Connaught; and on Lough Tawnyard, in Mayo, I counted eighty nests on one side of such an island, on which I found several Herons' nests in tall, straggling Hollies in the interior of the thicket.

Heron habitually build on Hollies, which often grow to a great size, and on any low trees or bushes available, on the islands of the moorland lakes of the West of Ireland from Donegal to Kerry. In Connemara, a district of bogs and granite mountains, the only attempts at a bush-growth (for one cannot call this trees) is on the islands of the many lakes. Here such species as the Merlin and Hooded Crow resort to breed, and Wood-Pigeons are common. Mr. Witherby found two nests of the latter on the ground among heather on an island in Lough Corrib. This is not so surprising to me, when I remember a Heron's nest on the stony brow of an islet in Lough Ilion, Co. Donegal, and the nest of a Magpie but two feet from the ground, not far from that of the Heron.

¹ *Birds of Ireland*, p. 153.

Sedge Warblers are common on Lough Corrib, and that inevitable bird of the Irish lakes, the Reed Bunting. It seems to breed on every island in many counties. I found a nest well under a boulder on one of the stony islands of Lough Mask. Sand-Martins excavate the escarpment of the boulder-clay that caps several of the islands in these lakes, and they breed in the walls of a ruined castle on Lough Cullin (Warren); but the small bird that aroused my interest most was the Yellow Wagtail, which nests extensively on the three lakes, Corrib, Mask, and Cara, chiefly on the islands. I was attracted, by the female leaving it, to one nest containing six eggs, overhung by a stone, among short sedgy grass. In parts of Lough Corrib a pair seems to occupy each island. Mr. W. H. Good, of Westport, informed Mr. Warren and me that this species, so local in Ireland, was to be found breeding on Lough Mask, and our surprise at finding it on these lakes is due to the fact that the only other breeding-ground of the species known in Ireland is on Lough Neagh, in Ulster. This discontinuous distribution in Ireland is paralleled by similar habits of the Yellow Wagtail in the North of England. As a migrant it has occurred at Co. Wexford light-stations, which shows that some at least of this species cross by the Wexford migration-route used by so many of the Passerine birds that visit Ireland.

Before quitting Lough Corrib I may mention that I have found the Brimstone Butterfly (*Gonepteryx rhamni*) on many of the islands in June, as well as on those of the Shannon Lakes.

Of winter migrants to the northern lakes of this chain Bewick's Swan is the most remarkable; flocks of this fine bird have repeatedly been seen on Loughs Conn and Cullin by Mr. Warren.

The Woodcock, a migrant of more interest to the sportsman, after coming down the Donegal coast, crosses Connaught on its southern journey in large numbers by this line of lakes, where many take up their winter abode. The plantations of Lord Ardilaun at Ashford, on Lough Mask, being carefully preserved, afford a great annual cock-shoot, which has become famous, and in which Royalty has taken part this year. 209 and 211 birds have been killed in one day on different years, while as many as 508 have been shot in six days by seven guns,

Lord Ardilaun has given me to understand that after each spell of severe weather, which drives the cock in from the hills, a smaller number leave the coverts ; and thus more birds may be met with in the end of January than at an earlier period of the winter. Some breed at Ashford, and these appear to be increasing, for in the spring of 1902 for the first time a considerable number nested in a valley in the hills. These do not as yet approach the numbers that nest in Co. Wicklow, but as our summer Woodcocks have been steadily on the increase since the first notice in 1833 (Thompson) there can be little doubt that Connaught woods are destined to be more largely used as breeding-quarters.

Among the species that are extending their breeding-range in this country is the Shoveler, whose nest has been repeatedly taken of late years on Lough Conn ; and though I have not yet learned that the Tufted Duck frequents that lake, and those to the south of it, in summer, this bird has become so numerous on the Co. Sligo lakes in the breeding-time that its presence at that season further west may be looked for.

The lakes of Sligo and Roscommon form a group rich in bird-life ; they comprise Loughs Gill, Arrow, Key, and Gara, some of which have shores and islands adorned with natural wood, and afford some of the most beautiful lake-scenes in Ireland.

The Whinchat, though not a lake-bird, frequents the boggy lands in the neighbourhood of these lakes and the marshy hollows towards Ballymote, being probably more numerous in that district than elsewhere in Ireland. It seems to be absent from the greater part of Munster and Leinster.

The range of the Garden-Warbler includes the wooded shores and islands of Lough Arrow and Lough Key, and I have met with it in song in successive seasons in the same haunts.

The Blackcap has also been identified by its song in Rockingham woods by Mr. Ellison and myself.

Siskins were seen and heard by us in June among the lofty fir-trees in the demesnes of Hazlewood, Markree, and Rockingham. We met with them in family parties, and they evidently breed there, as well as Crossbills, which were observed at the same seasons at Hazlewood and Markree.

The Lesser Redpoll was found nesting near Lough Key, and though its breeding-range in Ireland is a wide one, I notice it here as a species that easily escapes observation.

The ducks which make these lakes their breeding-haunts are numerous. Besides Mallards in abundance, we were entertained by a female Shoveler, which disported herself near our boat with agonized antics to allure us from her brood, in a reedy bay of Lough Key; elsewhere males of this beautiful species were seen on the same lake, having evidently withdrawn from matrimonial cares, as they do when the females are hatching.

The Tufted Duck is the species most in evidence on these lakes, and its increase within recent memory has been marked. New as it is among the breeding birds of Ireland, it had become so numerous on Lough Key in 1896, that at least ten of these ducks might be counted on any part of its waters. The nests are to be found in June on all the islands, and on Lough Arrow we found them in dense clumps of rushes on a grassy peninsula, with cattle grazing between them. The completed clutch was generally covered with a veil of dusky down that concealed the eggs. I visited a similar breeding-ground of the Tufted Duck on an island in Lough Gara in 1901.

Mergansers add conspicuously to this bird-population, and so do the Cormorants, notwithstanding efforts to reduce them in the interests of fishing. I saw thirty of these birds together on a stony island in Lough Key in 1896. They probably represented broods that had quitted neighbouring nests with their parents. On an island in this lake a colony of Cormorants have long bred, in ash trees from 30 to 40 feet high. Their nests here, as on Lough Tawnyard, Co. Mayo, are more compact than the wide, basket-like structure of Herons. We find the four species of *Limicolæ* nesting on the lake-islands—the Ringed Plover, Common Sandpiper, Redshank, and Dunlin—the last chiefly on Lough Gara, where I saw numbers in June inhabiting a long, little-frequented point. I also saw the eggs taken on Inch Island in short herbage near the shore. Redshanks make a lively outcry as they flit round over the intruder, or descend like parachutes to divert attention from their nests.

Of the Black-headed Gull I found dense assemblages breeding on two stony islets in Lough Key, though in 1896 these had been repeatedly robbed of their eggs to feed pheasants. I was interested to watch these gulls chasing moths on the wing over a field near that lake in the evening twilight.

The Lesser Black-backed Gull may be met with on Lough Key in summer. It probably breeds in some lonely bog in the district. Common Terns also nest on the stony islands of all the lakes, and in 1891 I found five nests below the margins of the sod of a very small islet overlooked by the pleasure-grounds at Rockingham. The next time I visited it, the brushwood had overgrown it so much that there was no room for the Terns, but a Tufted Duck nested in the centre.

The Great Crested Grebe breeds on those lakes, on whose waters its quaint form adds variety to the diverse bird population so representative of the woodland, the marsh, and the inland waters, including also species that one expects to find rather on the sea-coast.

On the west side of the Moy estuary, in the County Mayo, a shallow piece of water, with marshy shores, is named Rathroeen Lake. On the single island that this lake contains Mr. Warren discovered a colony of Sandwich Terns breeding in 1858, and they continue to nest there in the midst of a host of Black-headed Gulls, the place being carefully preserved; great numbers of Mallards and Teal breed round the lake, and Redshanks and Lapwings also take advantage of this excellent asylum. Being close to Killala Bay, the Terns have ample fishing-grounds, whence they may be seen flying to the lake with sand-eels in their bills. These fine birds are the feature of interest in the bird-life of the place, only one other colony of Sandwich Terns being known in Ireland, in an Ulster county. They are not merely distinguished from the Common Terns by greater size and breadth of wing, but by their proportions, the large head and shoulders reminding one of the form of a fish, and contrasting with the proportionally short tail and hindquarters. The cry is also very distinctive.

In the month of June, as one views the island from a neighbouring rising ground, its centre seems paved with

white birds, the Gulls far outnumbering the Terns, which frequent the centre.

In 1890 I reached that island by swimming, in spite of the menacing stoops of the crowd of excited Gulls. The bank was overgrown with large sallows, on creeping through which I was confronted by a zone of tall nettles; trampling down these I reached the open space which forms the citadel of the Sandwich Terns. It was strewn with their eggs on what I can only describe as a common floor of nesting material, composed of bits of reed, the nesting hollows in this being very slight. The newly-hatched Terns were not in fluffy down like the young Gulls, which occupied nests all around, and even under the trees and bushes. The coating of the former lay close to their bodies. By this time, 15th June, most of the fertile eggs had evidently been hatched, as those that remained, being mostly single and discoloured, seemed to be addled. We found the caretaker of this lake came at once upon the scene when the birds were disturbed, and without permission of the owner no one is allowed to visit the place.

In north-western Mayo, Lough Carrowmore contains islands on which Cormorants and Herons breed on low trees and bushes, and some of the former nest on the ground among tall weeds. The Common Gull also breeds on the islands of this lake, as it does on many of the small moorland lakes near the coasts of Donegal, Mayo, and Connemara. Its nests are to be found in depressions of the rocky surface, and even perched on isolated rock-masses in these lakes, which are not always in districts deserted by man. The peasant's cottage may overlook a lake where Herons and Gulls are nesting on islets in full view, but these are no more disturbed than a rookery would be in other counties.

Before Eagles of both species were so widely exterminated in Ireland, there were instances in which they nested on low trees or bushes on lake-islands in the bogs of western Connaught.

The number of Herons that breed on some of the islands of Connemara lakes is surprising. On Lough Bolard, in Connemara, seventy Herons, old and young, were killed on one occasion, and many dozens of eggs taken. I visited it in

June after this raid had been made, and found the eggs and nestlings of second clutches in the huge open nests. These were in Hollies, which grow there into trees of considerable size, being evidently of great age. All that district, from Clifden along the southern margin of Co. Galway, is full of Herons, which are met with on the creeks and loughs, and seem to replace the Rook in abundance. Of course there are no stately trees for them to breed in, but that is quite unessential, as isolated bushes in a bog-lake suit them as well.

The Hooded Crow builds in similar positions, and the Kestrel uses the old nest when deserted by the Crow.

The two small lakes of Termoncarra and Cross in the Mullet are favourite resorts of Bewick's Swan in winter, and in hard seasons large flocks of these birds may be seen there, and fly from one lake to the other. In ordinary seasons they occur in small parties, but from November, 1892, to February, 1893, upwards of a thousand were to be seen daily for weeks, as the late Dr. Burkitt informed me. Numbers of wild fowl of other species are said to frequent those lakes, and on or near them the Snow Goose has more than once occurred; while the Greenland Falcon has been repeatedly taken in that district, notably in the spring of 1905.

Cappagh, Co. Waterford.

NOTES.

BOTANY.

***Thuidium delicatulum* Mitt. in Co. Dublin,**

I found this rare moss on the sandhills at Malahide last spring (1904) when botanising there with Mr. D. M'Ardle. It has been found twice before in Ireland, in Co. Derry and Co. Down, in similar localities by the sea, and should be looked for in suitable places inland.

C. H. WADDELL.

Saintfield.

ZOOLOGY.

Notices of Irish Mollusca.

The current (April) number of the *Journal of Conchology* contains a note by Chas. Oldham on the findings of *Vallonia excentrica*, Sterki, at Mornington, Co. Meath, by P. H. Grierson, and a note by R. Welch on freshwater shells in masses in shell-marl, and one by Miss Massy on the opercula of *Bythinia tentaculata*.

Birds of the Skelligs.

One of the keepers of the Skelligs lighthouse (Mr. R. James) tells me that in March last they shot three Greenland Falcons and saw a great number of Little Auks round the rock. One of the Falcons was devouring an Auk when it was shot. I believe the Falcons were sent to Messrs. Williams, Dame-street.

MAUD J. DELAP.

Valencia.

White Wagtails at Bartragh,

The White Wagtails (*Motacilla alba*) paid their usual spring visit to the island during the prevalence of the fresh northerly winds of the three weeks preceding May 10. They were first observed about the 25th April, when four or five birds were seen at the usual haunt. These remained all that week, and early the next were joined by others, making up the number to eight, the entire flock remaining until the 6th May, when the wind changing to the south, they left the island before 11 o'clock. However, to replace those, four others arrived that evening, and probably will be joined by fresh arrivals if northerly winds prevail.

ROBERT WARREN.

Moyview, Ballina.

Corncrakes in Winter.

In the *Irish Naturalist* for May Mr. R. Patterson notes the shooting of a Corncrake near Lurgan on the 31st January, by a man who was attracted by the sound of its craking. It is to be hoped that the specimen has been preserved, for surely a Corncrake that has craked in January is deserving of the highest position in the local museum.

On the 19th February a Corncrake was seen by two gentlemen near Belfast as it crossed the road before them—another strange time of year for Corncrakes to be about—but then in explanation of their wanderings, we are told (what is very evident) that neither of these birds were hibernating. This of course is quite satisfactory to those who believe in the hibernating birds.

ROBERT WARREN.

Moyview, Ballina

Unnecessary Bird Killing.

I do not think that Mr. Nevin H. Foster's protest, under the above heading (p. 96), against the killing of a Glaucous Gull is altogether called for. This species runs no risk of having its numbers seriously, or even appreciably, reduced by the shooting of individuals that have straggled in winter to spots so far away from their breeding quarters as Ireland; and though it may be pleasanter to read of their being spared than killed, it might surely be left to a trained naturalist and life-long student of the Gull family like Mr. Warren, to judge for himself how many specimens it would be desirable for him to secure. In the case of the Glaucous Gull, and, indeed, of most Gulls, a very considerable number would be necessary to illustrate the different phases of plumage: and it is impossible to lay down a satisfactory hard-and-fast rule as to where the line should be drawn.

C. B. MOFFAT.

Dublin.

Iceland Gull in the Moy Estuary.

I have been much amused by Mr. Nevin H. Foster's attack on me in the April number of the *Irish Naturalist*, for shooting the Glaucous Gull recorded in the March number. I now have the pleasure of informing him, and other naturalists, that on April the 26th, I shot a very fine specimen of the Iceland Gull as it was swimming in the water near one of my fields here, in company of a young Herring Gull. It is very white in colour, being in the last season's stage of the immature plumage, this very peculiar white colour being common to both the Glaucous and Iceland Gulls of the same age. Its dimensions were:—Length, $21\frac{1}{2}$ inches; carpus, 16 inches; tarsus, 2 inches; while its closed wings extended $2\frac{1}{2}$ inches beyond the end of the tail feathers.

ROBERT WARREN.

Moyview, Ballina.

Supposed Wild Cat in Ireland.

I do not expect that Dr. Scharff will ever succeed in obtaining an Irish killed specimen of a Wild Cat, no more than one of *Mustela vulgaris*: though quite as grave statements of captures have been made from time to time, yet up to the present no specimen has been produced of either animal for inspection by competent naturalists.

Mr. Thompson never got one, neither did Dr. Ball nor Dr. Harvey, and we thus have our three greatest Irish naturalists of the north, middle, and south of Ireland, never seeing or obtaining a specimen of either animal during their long years of enquiry and observation.

There is no doubt that the Domestic Cat when wild-reared for several generations grows to an abnormal size and strength, almost rivalling its wild relative, and when with its dense coat of thick coarse fur, and of the true wild colour, it is easily mistaken by ordinary observers for a true Wild Cat.

I have myself trapped, and seen shot, old male specimens that were nearly twice the size and weight of the house cats, and one, that was of the wild colour and markings, only for his pointed tail, might easily have been mistaken for a true *Felis catus*.

Since Mr. Thompson's time, and that of his fellow naturalists, the trapping of rabbits has become so general all over Ireland, that scarcely a rabbit burrow anywhere has been untrapped, and when this has been the case, without specimens of either Wild Cat or Weasel being forthcoming, I do not see the slightest probability of either animal ever being obtained. Surely, the single instance of the finding of semifossil bones of a cat in a Co. Clare cave does not prove the Wild Cat to be a native of Ireland; something more will be required to prove it to Irish naturalists.

In proof of how easily persons may be mistaken, I may state that lately in the Dublin Museum there was a specimen of a wild reared domestic cat, of the wild colour and markings, sent to me by an English naturalist as a Wild Cat received by him from Ireland.

I do not think that the old fisherman's story to Mr. de Vismes Kane, as related by Mr. Welch in this month's *Irish Naturalist*, need be taken seriously, for if Wild Cats are so numerous as stated on the banks of Lackagh, in such a wild uninhabited district, where probably no trapper ever laid a trap, some remnants of the race must be yet in existence.

ROBERT WARREN.

Moyview, Ballina.

[Reference to Dr. Scharff's paper will show that the bones discovered in the Clare cave do not belong to *Felis catus* but to a distinct South European Wild Cat. It is of course this latter species which Dr. Scharff thinks may possibly still survive in remote corners of Ireland, and being externally much more like the Domestic Cat than *F. catus* is, it is the more likely to be overlooked. We disagree with Mr. Warren that Irish naturalists will not be content to accept this most interesting addition to our mammalian fauna on the evidence of Dr. Scharff's discovery, as it seems to us that no better evidence can be brought forward of the recent occurrence in any country of a particular animal than the existence of its bones in a sub-fossil condition.—EDS.]

IRISH CRUSTACEA OSTRACODA.

BY CANON A. M. NORMAN, M.A., D.C.L., LL.D., F.R.S., F.L.S.

THE object of this paper is to bring together all that is known respecting the representation of the order of Crustacea called Ostracoda in the Irish fauna.

The great extent of fresh water in Ireland ought to make that country very rich in species of Entomostraca which are not marine; but very little has been done among the fresh-water forms, although that little has brought to light species which have hitherto escaped detection elsewhere in the British Isles. It may be hoped that the publication of this list will induce some young naturalists in Ireland to take up this interesting study.

In recording habitats, I have given my own authority for some habitats where the species has been also found by other observers; because in thus acting I am giving confirmation to the record of localities already mentioned in Prof. Brady's and my monograph. I have looked through a great deal of material which I had not had time to examine when that monograph was published. This material has been for the most part collected by myself; but the Youghal sand was given me by my late friend, Dr. Jeffreys; the Aran sands were collected by the late Mr. George Barlee, and the Lough Foyle material gathered by the late Mr. Edward Waller.

The following publications have reference to Irish Ostracoda; and in the monographs are to be found very numerous Irish records, which are embodied in this paper:—

1. BRADY, G. S.—A Monograph of the Recent British Ostracoda. *Trans. Linn. Soc.*, vol. xxvi., 1868, p. 353.
2. BRADY, G. S., and D. ROBERTSON.—Notes on a Week's Dredging in the West of Ireland. *Ann. and Mag. Nat. Hist.*, ser. 4, vol. iii., 1869, p. 353.
3. BRADY, G. S., and D. ROBERTSON.—Contributions to the study of the Entomostraca. VI. On the distribution of the British Ostracoda. *Ann. and Mag. Nat. Hist.*, ser. 4, vol. ix., 1872, p. 48.
4. MALCOMSON, S. M.—Recent Ostracoda of Belfast Lough. *Proc. Belfast Nat. Field Club*, Appendix 1884-1885, p. 259.
5. MALCOMSON, S. M.—List of Ostracoda, in Haddon, &c.: First Report of the Marine Fauna of the South-west of Ireland. *Proc. Roy. Irish Acad.*, ser. 2, vol. iv., 1886, p. 632.

6. BRADY, G. S., and A. M. NORMAN.—Monograph of the Marine and Freshwater Ostracoda of the North Atlantic, and of North-western Europe—Section I. Podocopa. *Trans. Roy. Dubl. Soc.*, ser. 2, vol. iv., 1889, p. 63; and Part 2, Section ii.-iv. Myodocopa, Cladocopa, and Platycopa. *Ibidem*, vol. v., 1896, p. 621.
7. SCHARFF, R. F.—A list of Irish Ostracoda, compiled from Brady and Norman's Monograph. *Irish Naturalist*, 1897, p. 74.
8. BRADY, G. S.—Copepoda and other Crustacea taken in Ireland, and on the N.E. coast of England. *Nat. Hist. Trans., Northumberland, Durham, and Newcastle-upon-Tyne*, vol. xiv., 1902, p. 54.
9. BRADY, G. S.—List of the Ostracoda collected by Mr. George Murray, F.R.S., during the Cruise of the "Oceana" in 1898. *Ann. and Mag. Nat. Hist.*, ser. 7, vol. xii., 1903, p. 337.

I have taken the following excursions in Ireland. (I only mention those, or those parts of excursions, where I collected material for Ostracoda):—

1858. Bantry and Glengarriff.
1868. Belfast and Strangford Lough.
1870. Valentia, dredging in company with my friend, Mr. Edward Waller, in Dr. Gwyn Jeffreys' yacht "Osprey."
Dr. Jeffreys was unable to be with us.
1874. Westport and Roundstone, in company with my friend, Dr. D. Robertson.
1900. Clifden and Connemara, and subsequently counties Clare and Monaghan, in company with my friend, Mr. W. F. de Vismes Kane.

In 1885, with the very kind help of a gentleman in the neighbourhood, I employed two men for a week to use the trowel and dredge in Lough Neagh. My chief object was, if possible to find *Mysis relicta*, which I had sought for in vain in some of the largest lakes of Scotland. Amidst an enormous amount of plankton material was a single specimen which proved the presence of that *Mysis* in Ireland. It has since been taken in the same lough in abundance by Mr. Kane and others, and also in Lough Erne.

The present catalogue gives a larger number of marine Ostracoda than are found on the coasts of either England or Scotland. The deep water off the west of Ireland affords that country great advantages, which must increase more and more as the investigation of its deep-sea fauna is carried on more thoroughly.

The nomenclature employed is that of Professor Brady and my monograph, unless otherwise noted.

OSTRACODA.

Section I.—PODOCOPA.

Fam. I.—CYPRIDÆ.

Genus 1.—*Cypria*, Zenker.

- Cypria ophthalmica*** (Jurine).—No doubt common everywhere, as I have found it to be in the counties Antrim, Meath, Monaghan, Fermanagh, Mayo, Galway, and Clare.
- C. exsculpta*** (S. Fischer).—Lough Neagh (A.M.N.), contained in B. and R.'s¹ list of species of Galway and Mayo.

Genus 2.—*Cyclocypris*, Brady and Norman.

- Cyclocypris lævis*** (O. F. Müller).—Lough Neagh (A.M.N.); Lough Erne (Kane!); Grand Canal, Dublin, and counties Galway and Mayo (B. and R.).
- C. serena*** (Koch).—Ballyvaughan, Co. Clare; Braggan, Cornacassa, and Drumreask, all near Monaghan (A.M.N.); Loughs of Mayo and Galway (B. and R.).
- C. globosa*** (G. O. Sars).—Ballinahinch and Clifden, Co. Galway; mountain tarn at Braggan, near Monaghan; Cregduff Lough, Roundstone (A.M.N.).

Genus 3.—*Cypris*, O. F. Müller.

- C. virens*** (Jurine).—Belfast (A.M.N.).
- C. incongruens*** (Rambuhr).—Belfast (A.M.N.), Isle of Aran (Inishmore), Co. Galway (G.S.B.).
- C. pubera***, O. F. Müller.—Mr. W. F. de V. Kane sent me specimens of this species for examination, which he had taken in Lough Neagh. Dr. G. W. Müller has instituted a new subgenus *Eurycypris* with this species as the type. This cannot stand, for while most of the other species which O. F. Müller included in his genus *Cypris* have been assigned subsequently to other genera, *Cypris pubera* has been left as the type, and with especial propriety, since it was the first species of those ranged under *Cypris* in his *Zool. Dan. Prodrömus*.
- C. reticulata***, Zaddach.—Ireland (G.S.B.).
- C. fuscata***, Jurine.—Ireland (G.S.B.) This and the last species are entered in the Irish column, p. 250, of Prof. Brady's and my Monograph; I do not remember on what authority, but conclude that it was that of Prof. Brady.

¹ Here, and throughout, used as the initials of Brady and Robertson.

Cypris bispinosa, Baird.—When Mr. E. Waller and I were together at Valentia in 1870 he brought me some living examples of this splendid species, which he had procured in a small pond, which I think was on an island in the harbour. The types described by Baird were from North Africa, where it has since been again found. Very many years ago the late Dr. Lukis gave me some examples which he had taken in Guernsey. Judging from its known habitats it would seem to be a species which likes a little taste of salt in the water which it inhabits.

Genus 4.—**Cyprinotus**, G. S. Brady.

Cyprinotus prasinus (S. Fischer).—The *Cyprinotus salinus* of Brady is undoubtedly a synonym of Fischer's species. That author found his types at Palermo in Sicily, where I have myself taken the species in the Botanic Gardens. *Cyprinotus prasinus*, *Cypridopsis aculeata*, and *Cytheridea torosa* are three Ostracoda which, although found also quite inland, seem to prefer water not far from the sea which has some slight admixture of salt; and *Cypris incongruens* may perhaps be associated with them. They must not, however, be classed with denizens of such brackish water as is the home of *Hydrobia ventrosa*, *Alderia modesta*, *Palæmonetes varians*, *Neomysis vulgaris*, *Spheroma rugicauda*, *Idotea viridis* Slabber (= *I. salinarum* Dollfus), *Corophium grossipes*, *Lexaconcha viridis*, *Cytherura gibba*, many Copepoda, and of *Foraminifera*, *Nonionina depressula*, and *Polystomella striatopunctata*, all of which species are peculiarly typical of brackish water, and are found neither in absolutely salt nor in absolutely fresh water. Ballyvaughan, Co. Clare; Newport, Co. Mayo; and in a locality far inland, a mountain tarn at Braggan, Co. Monaghan (A.M.N.).

Genus 5.—**Herpetocypris**, Brady and Norman.

Herpetocypris reptans (Baird).—Lough Neagh (A.M.N.); Lough Erne and Achill (Kane!); Loughs in Mayo and Galway, and Grand Canal, Dublin (B. and R.).

H. tumefacta (Brady and Robertson).—Cornacassa near Monaghan (A.M.N.).

Genus 6.—**Ilyodromus**, G. O. Sars.

Ilyodromus olivaceus (Brady and Norman).—Mr. de Vismes Kane sent to me for determination specimens taken in Upper Lough Erne.

Genus 7.—**Plonocypris**, Brady and Norman.

Plonocypris vidua (O. F. Müller).—Lough Neagh, Cregduff Lough near Roundstone, and many places near Monaghan (A.M.N.); Loughs in Mayo and Galway, and Grand Canal, Dublin (B. and R.).

P. obesa, Brady and Robertson.—Belfast and Mullingar canals, and Loughs in Mayo and Galway (B. and R.) I believe that this must be united with the last, but Prof. G. O. Sars keeps them distinct.

Genus 8.—**Cypridopsis**, G. S. Brady.

Cypridopsis aculeata (Costa).—I found this in abundance in company with *Cyprinotus prasinus* in slightly brackish water at Ballyvaughan, Co. Clare; also in company with the same species in a mountain tarn at Braggan near Monaghan; and I have also taken it at Newport, Co. Mayo.

C. villosa (Jurine).—This species is included in B. and R.'s list of the species of Mayo and Galway, and Dr. Malcomson found it washed down into the sea at Belfast.

C. Newtoni, Brady and Robertson.—Rossmore, Co. Monaghan (A.M.N.).

C. variegata, Brady and Norman.—In a small pond on the east side of Lough Neagh through which a stream of spring water runs into the lough; also in Lough Neagh canal (A.M.N.).

Genus 9.—**Potamocypris**, G. S. Brady.

Potamocypris fulva, G. S. Brady.—River Liffey at Dublin, and "West of Ireland" (G.S.B.).

Genus 10.—**Aglala**, G. S. Brady.

Aglala complanata, Brady and Robertson.—Low water, Ballyvaughan, Co. Clare, and Birturbuy Bay (A.M.N.); Westport Bay in four fathoms (B. and R.) This species has not yet been found on the coasts of Great Britain.

Genus 11.—**Paracypris**, G. O. Sars.

Paracypris polita, G. O. Sars.—Aran, Dingle Bay, Killary Bay (A.M.N.); tide marks, Island Magee, Co. Antrim (Malcomson).

Genus 12.—**Notodromus**, Lilljeborg.

Notodromus monacha (O. F. Müller).—Newport, Co. Mayo, and in two places near Monaghan (A.M.N.); Coolbarreen Lough, Mayo (B. & R.).

Genus 13.—**Candona**, Baird.

Candona candida (O. F. Müller).—I have seen this common species from the counties Antrim, Monaghan, Clare, and Galway.

Var. **clavæformis**, Brady and Norman.—Lough Neagh, sent to me by Mr. Kane.

C. elongata, Brady and Norman.—The types, and as yet only known examples, were found in a gathering taken from the bottom of Lough Neagh in 1885 (A.M.N.).

C. compressa (Koch).—Brady, in his monograph, writes: "A single valve, belonging apparently to this species, occurred amongst Ostracoda found by Dr. Alcock in shell-sand from Roundstone."

C. fabæformis (S. Fischer).—Coolbarreen Lough, Mayo (B. & R.).

C. lactea, Baird.—Lough Neagh (A.M.N.); Drumreaskie, near Monaghan (Kane).

Genus 14.—**Candonopsis**, Vavra.

[Vavra, Monographie der Ostracoden Böhmens, 1891, p. 54, and G. W. Müller, Zoologica. Deutschlands Süßwasser Ostracoden, 1900, p. 37.]

Candonopsis Kingsleii (Brady and Robertson).—Ballynahinch, Co. Galway (A.M.N.); Brady also includes it in his list of the species of Mayo and Galway.

Genus 15.—**Ilyocypris**, Brady and Norman.

Ilyocypris Bradli, G. O. Sars.—Ballyvaughan (A.M.N.).

Genus 16.—**Pontocypris**, G. O. Sars.

Pontocypris mytilloides (Norman).—Valentia, Aran, Birturbuy and Westport Bays, Lough Foyle, Strangford Lough (A. M. N.); Clifden Bay (B. & R.); Bantry Bay, and off the Maidens Lighthouse, Co. Antrim (S. M. M.).

P. trigonella, G. O. Sars.—Valentia, Aran, Birturbuy Bay, Westport, Ballyvaughan, Co. Clare (A. M. N.); Clifden and Dublin (B. & R.); Rockport, Co. Down (S. M. M.).

P. hispida, G. O. Sars.—Birturbuy Bay (B. & R.). The only other known habitat in our fauna is Shetland, whence I recorded it in 1868.

P. acupunctata, G. S. Brady.—Valentia (A. M. N.); in shell-sand, Roundstone (Dr. Alcock). This is a very rare species.

Genus 17.—**Anchistrocheles**, Brady and Norman.

Anchistrocheles acerosa (G. S. Brady).—Off the Maidens Lighthouse in 60 fathoms; east of the Gobbins, 60 fathoms; and off Black Head in 75 fathoms, all off the Antrim coast (S. M. M.). This is a very rare species, and where found is, as far as our observations go, numerically very scarce.

Genus 18.—**Argilloëcia**, G. O. Sars.

Argilloëcia cylindrica, G. O. Sars.—Valentia, Aran, Roundstone, Lough Foyle (A. M. N.); Clifden and Birturbuy Bays (B. & R.); Bantry Bay, off the Antrim coast, and in Belfast Lough (S. M. M.).

Fam. II.—**BAIRDIIDÆ.**Genus 1.—**Bairdia**, M'Coy.

Bairdia inflata, Norman.—Valentia, Westport, Larne (A. M. N.); Birturbuy Bay, in 10-15 fathoms (G. S. B.); Aran and Galway Bay (Prof. Rowney); Berehaven, 4 fathoms; off Antrim coast in 10-62 fathoms, and in Belfast Lough (S. M. M.).

Bairdia hirsuta, G. S. Brady.

1880. *Bairdia hirsuta*, G. S. Brady, Report "Challenger" Exped. Ostracoda, p. 50, pl. viii., figs. 3 a-d.

Two specimens, which exactly agree with the above description and figures, were taken by the "Porcupine" Expedition of 1869, station 20, lat $55^{\circ} 11' N.$, long. $11^{\circ} 31' W.$, to the west of Donegal, in 1,443 fathoms. The "Challenger" specimens were dredged in the South Atlantic in 1,375 and 1,825 fathoms (A. M. N.).

B. subdeltoides (? Münster), T. R. Jones.

1856. *Bairdia subdeltoides*, T. R. Jones, Mon. Tertiary Entom. *Palæont. Soc.*, p. 52, pl. iv., 2, 2a.

1894. ? *Bairdia decipiens*, G. W. Müller, Fauna und Flora des Golfes von Neapel—Ostracoden, p. 269, pl. xiii., fig. 29; pl. xiv., figs. 10, 21, 22.

A single valve dredged in 1869 by the "Porcupine," station 19, lat. $56^{\circ} 11' N.$, long. $10^{\circ} 56' W.$, in 1,366 fathoms, exactly agrees with the figure of Prof. T. Rupert Jones, to which I have above referred. Of the various species described by Brady and by Müller, it seems to come nearest to *B. decipiens*, Müller. The *Bairdia* are a very difficult group. The sexual differences would seem to be considerable, and the difficulty is increased by the difference in form of the two valves, and of the variation of outline at different periods of development.

Genus 2.—**Macrocypris**, G. O. Sars.

Macrocypris minna (Baird).—Dredged by the "Porcupine," 1869, station 3, in the ocean west of Bantry, lat. $51^{\circ} 38' N.$, long. $12^{\circ} 50' W.$, in 722 fathoms. The only other British locality is off Shetland, where it was dredged first by Mr. M'Andrew, and subsequently in two different years by myself (A. M. N.).

M. silquosa, G. S. Brady.—"Porcupine," 1869, station 19, a broken but unmistakable part of a valve, lat. $56^{\circ} 11' N.$, long. $10^{\circ} 56' W.$, that is, to the west of Donegal, in 1,366 fathoms (A. M. N.).

Genus 3.—**Bythocypris**, G. S. Brady.

B. obtusata, G. O. Sars.—Off the Antrim coast, in 60 fathoms (S. M. M.).

Fam. III.—**DARWINULIDÆ.**Genus 1.—**Darwinula**, Brady and Robertson.

Darwinula Stevensoni, Brady and Robertson.—Cregduff Lough, Roundstone (A. M. N.); Loughs Inagh, Corrib, Agraftard, Arddery, and Mesarahoge, in Connemara (B. & R.).

Fam. IV.—CYTHERIDÆ.

Genus 1.—**Metacypris**, Brady and Robertson.

Metacypris cordata, Brady and Robertson.—This interesting fresh-water species has been taken by B. and R. in Coolbareen Lough, Co. Mayo, and Lough Aubwee, Galway.

Genus 2.—**Cythere**, O. F. Müller.

Cythere lutea, O. F. Müller.—Bantry, Valentia, Ballyvaughan, in Co. Clare, Aran, Clew Bay (A. M. N.); Birturbuy and Dublin Bays (B. & R.); Antrim coast and Belfast Lough (S. M. M.)

C. cyamos, Norman.

1865. *Cythere viridis*, G. O. Sars—Oversigt af Norges Marine Ostracoden. Vid. Selsk. Forhand, p. 30.

1868. *Cythere viridis*, G. S. Brady.—Mon. rec. Brit. Ostrac., *Trans. Linn. Soc.*, vol. xxvi., p. 397, pl. xxviii., figs. 40-41, and 57-59, pl. xxxviii., fig. 8.

I had for some time thought that this was the young of *C. lutea*, and it is true that the young of the latter species is very like *C. cyamos*, yet it has not quite the same form. Sars referred this species to the *Cythere viridis* of Müller, but I regard Müller's species as that which Prof. Brady used to name *Loxoconcha elliptica*.

Newcastle, Co. Down (Brady); Berehaven, 4 fathoms (S. M. M.).

C. confusa, Brady & Norman.—Bantry, Valentia Harbour, Dingle Bay, Aran, Clew Bay, Lough Foyle, Strangford Lough (A. M. N.); Dublin, Clifden, and Birturbuy Bays (B. & R.); Berehaven and Belfast Lough (S. M. M.). This is *C. pellucida* of Brady's monograph. I do not quote localities given in that work, as at the time when it was published several species were confused with this.

C. pellucida, Baird.—Valentia, Westport, Lough Foyle (A. M. N.); Clifden Bay (B. & R.); Dublin Bay and Belfast canal (G. S. B.); Belfast Lough and off Black Head, Co. Antrim, 15-18 fathoms (S. M. M.).

C. porcellanea, G. S. Brady.—Valentia, Aran, Westport (A. M. N.); Belfast Lough (S. M. M.).

C. macallana, Brady and Robertson.—Ballyvaughan, Co. Clare, tide marks at Aran, Westport (A. M. N.); Dublin Bay, Clifden Bay, 3-5 fathoms, and Birturbuy Bay (B. & R.); Belfast Lough, tide marks (S. M. M.).

C. tenera, G. S. Brady.—Valentia, Dingle Bay, Aran, Lough Foyle (A. M. N.); Dublin and Birturbuy Bay (B. & A.); coast of Kerry and Belfast Lough, tide marks to 60 fathoms (S. M. M.).

C. semipunctata, G. S. Brady.—Aran, Birturbuy Bay, Westport (A. M. N.); Mulroy Bay (B. & R.); Antrim coast and Belfast Lough (S. M. M.).

C. badia, Norman.—Bantry, Aran, Roundstone Bay (A. M. N.); Westport (B. & R.); Antrim coast and Belfast Lough (S. M. M.).

- Cythere crispata**, G. S. Brady.—Valentia, Aran, Roundstone, Westport (A. M. N.); Dublin, Clifden, and Birturbuy Bays (B. & R.); Berehaven, Antrim coast, and Belfast Lough, tide marks to 60 fathoms (S. M. M.).
- C. cribrosa**, Brady, Crosskey, and Robertson.—Dr. Malcomson records a single specimen of this species as having been found by him at Rockport, Co. Down. This is the only instance of *C. cribrosa*, which was described as a fossil of the post-tertiary beds, being found recent. When we remember that off Belfast the dredge brings up arctic post-tertiary Mollusca which no longer live in our seas, but which have a remarkably recent appearance, it is possible that the specimen found by Dr. Malcomson may have been washed out of the same sub-marine strata.
- C. sulcifera**, Brady and Norman.—“Porcupine,” 1869, station 19, east of Donegal, in 1,360 fathoms. The type and only known specimen.
- C. gibbosa**, Brady & Robertson.—A brackish water species. Newport and Westport, Co. Mayo (A. M. N.); Roundstone, Mulroy Bay, canal at Belfast (B. & R.); Dundrum (G. S. B.); Rockport, Co. Down, and off the Maidens Lighthouse in 60 fathoms (S. M. M.). The specimen in this last locality must have been washed out to sea.
- C. rubida**, G. S. Brady.—I found this species in 1902, living at low water, at Ballyvaughan, Co. Clare. This widely extends our knowledge of its distribution in our seas. All previous examples had occurred in the Clyde district, the second Irish locality being between tide marks, Rockport, Co. Down (S. M. M.); and the remaining two habitats are both in the Firth of Clyde itself—namely, Lamash Bay, where I took the type specimens in 1854, and the Isle of Cumbræ, where it was found by the late Dr. D. Robertson. It occurs in Norway, and was described by Professor G. O. Sars under the name *Cythere drammensis*.
- C. albomaculata**, Baird.—Youghal, Valentia, Dingle Bay, Bantry, Ballyvaughan, Aran, Roundstone, Lough Foyle, Strangford Lough (A. M. N.); Dublin, Clifden, and Birturbuy Bays (B. & R.); Newcastle, Co. Down (G. S. B.); Antrim coast and Belfast Lough (S. M. M.).
- This species is abundant in rock-pools all round our coast. Northwards, in Norway, it would seem to be very scarce, as Professor Sars had not met with it; but I took a few specimens at Lervig, in the Hardanger Fiord. To the south it is not recorded in Dr. G. W. Müller’s fine work on the Mediterranean Ostracoda. Nevertheless it would seem to be a southern form, since I found it to be common in rock-pools at Madeira in 1897.
- C. Robertsoni**, G. S. Brady.—Bantry, Aran, Westport (A. M. N.); Roundstone (Robertson in Mus. Nor.); Dublin (B. & R.); Berehaven, entrance Bantry Bay; 40 fathoms off Antrim coast, and in Belfast Lough (S. M. M.).

- Cythere convexa**, Baird.—Youghal, Valentia, Dingle Bay, Ballyvaughan, Aran, Clew Bay, Strangford Lough (A. M. N.); Cork (C. E. Davison); Dublin, Roundstone, and Birturbuy Bays (B. & R.); Berehaven, Antrim coast, and Belfast Lough (S. M. M.). A species of wide range from tide marks to a considerable depth.
- C. marginata**, Norman.—Birturbuy Bay (B. and R.); four miles E. of the Gobbins, Antrim, in 60 fathoms (S. M. M.).
- C. Jeffreysii**, G. S. Brady.—Roundstone in shell-sand (Dr. Alcock); Birturbuy Bay in 10-15 fathoms (B. & R.).
- C. limicola**, Norman.—Off S.W. Ireland, in 110 fathoms; one mile off the Gobbins, Antrim, in 15-18 fathoms, and Belfast Lough, 6-10 fathoms (S. M. M.). This I have myself only met with in deep water.
- C. cuneliformis**, G. S. Brady.—Aran (A. M. N.); shell-sand from Galway (Prof. Rowney); Roundstone Bay, 2-3 fathoms (G. S. B.); Dublin and Westport Bays (B. & R.); off Antrim coast and in Belfast Lough, down to 60 fathoms (S. M. M.).
- C. navicula**, Norman.—Roundstone and Birturbuy Bays, Larne (A. M. N.); Berehaven, Antrim coast, and Belfast Lough, tide marks to 60 fathoms (S. M. M.).
- C. globulifera**, G. S. Brady.—Off Valentia, 112 fathoms (A. M. N.); Roundstone, in shell-sand (G. S. B.); S.S.E. of Maidens Lighthouse on Antrim coast, 72 fathoms, and off the Great Skellig, Co. Kerry (S. M. M.).
- C. cluthæ**, Brady, Crosskey, and Robertson.—Dr. Malcomson wrote of this very rare species—"Although rare, this species appears to be generally distributed in the deeper water." The localities in which he found it were off the Antrim coast, in 60-72 fathoms, 2-5 miles S.E. of the Maidens Lighthouse, and half a mile off Coalpit Bay, in 13 fathoms; also off White Head in Belfast Lough, in 10-18 fathoms. The only other known locality in our seas is Loch Fyne, where it was taken by Dr. Scott, in about 20 fathoms. It is an Arctic form. In Nares' Arctic Expedition it was dredged in 80 fathoms off Cape Frazier; and in 1890 I dredged it living in two localities in East Finmark, viz., in the Varanger Fiord, in 125-150 fathoms, and in Bög Fiord, in 20-30 fathoms.
- C. pulchella**, G. S. Brady.—"A great many somewhat dwarfed specimens, apparently belonging to this species, were found at Berehaven in 4 fathoms" (S. M. M.).
- C. villosa**, G. O. Sars.—Bantry, Valentia Harbour, Ballyvaughan, Aran, Westport, Lough Foyle, Strangford Lough, Youghal (A. M. N.); Donegal Bay (E. C. Davison); Newcastle and Birturbuy Bay (G. S. B.); Dublin and Clifden Bay (B. & R.); Berehaven, Antrim coast and Belfast Lough (S. M. M.).
- C. acanthoderma**, G. S. Brady.—"Porcupine," 1869, station 19, lat. 54° 53' N., long. 10° 56' W., to the west of Donegal, in 1,360 fathoms, and also at station 20, lat. 55° 11' N., long. 11° 31' W., in 1,443 fathoms (A. M. N.).

- Cythere echinata**, G. O. Sars.—“Porcupine,” 1869, with the last at station 19; also a few specimens and a single valve, station 34, lat. $49^{\circ} 51' N.$, long. $10^{\circ} 12'$, that is, due south of Bantry, in 75 fathoms (A. M. N.)
- C. dasyderma**, G. S. Brady.—“Porcupine,” stations 19 and 20, as above (A. M. N.)
- C. scabrocuneata**, G. S. Brady.—Dredged with the three preceding abyssal species at station 19, in 1,360 fathoms. All these species have a wide geographical range in very deep water in the Atlantic.
- C. quadridentata**, Baird.—Valentia, in 80 fathoms; Aran, Birturbuy, and Killary Bays (A. M. N.); Clifden Bay and Mulroy Bay (B. & R.); off Kerry coast; off Black Head, Antrim, in 15-18 fathoms, and in Belfast Lough, tidemarks to 10 fathoms (S. M. M.)
- C. emaciata**, G. S. Brady.—Bantry, Valentia, Dingle Bay, Aran, Birturbuy Bay, Clew Bay (A. M. N.); Baltimore (C. E. Davison); Clifden Bay and Mulroy Bay (G. S. B.); Galway Bay (Prof. Rowney); Berehaven, Antrim coast and Belfast Lough (S. M. M.)
- C. tuberculata** (G. O. Sars).—Bantry, Valentia, Westport (A. M. N.); Roundstone (Dr. Alcock); Baltimore (Prof. Rowney); off Great Skellig, Antrim coast, and Belfast Lough, tidemarks to 60 fathoms (S. M. M.)
- C. concinna** (T. R. Jones).—Off Valentia, Lough Foyle (A. M. N.); Roundstone (Dr. Alcock); Antrim coast, tidemarks to 18 fathoms, Rockport, Co. Down, and off Kerry coast (S. M. M.)
- C. finmarchica** (G. O. Sars).—Roundstone, in shell-sand (Dr. Alcock); Galway Bay, in shell-sand (Prof. Rowney), off Great Skellig, Co. Kerry, Brown's Bay, Co. Antrim, tidemarks to 72 fathoms; Belfast Lough, 10 fathoms (S. M. M.)
- C. angulata** (G. O. Sars).—Dublin, Birturbuy, Clifden, and Westport Bays (B. & R.); off the Maidens Lighthouse, Antrim, in 60 fathoms; Belfast Lough, 6-8 fathoms; between tidemarks at Rockport, Donaghadee, and other places N.E. of Ireland (S. M. M.)
- C. Whitel** (Baird).—Dublin Bay (B. & S.); Island Magee, Co. Antrim, tidemarks, and off the coast of Kerry (S. M. M.)
- C. antiquata** (Baird).—Bantry, Valentia, and Aran (A. M. N.); Birturbuy and Westport Bays (B. & R.); Kerry coast; Antrim coast, 15-60 fathoms; Belfast Lough (S. M. M.)
- C. dunelmensis** Norman).—Off Valentia (A. M. N.); off Great Skellig, Co. Kerry; Rockport, Co. Down (S. M. M.)
- C. Jonesii** (Baird).—Off Valentia, to 112 fathoms; Bantry, Killary Bay, Aran (A. M. N.); Roundstone, in shell-sand (Dr. Alcock); Birturbuy Bay and Mulroy Bay (B. & R.); off Kerry coast, Antrim coast, 15-60 fathoms, Belfast Lough (S. M. M.)

Genus 3.—**Limnocythere**, G. S. Brady.

- Limnocythere inopinata** (Baird).—Lough Neagh (A. M. N.); Mullingar, canal at Dublin (B. & R.)
- L. Sancti-Patricii**, Brady and Robertson.—Lough Neagh and Rossmore, Co. Monaghan (A. M. N.); Lough Moher, which is about five miles south of Westport, Co. Mayo (B. & R.)

Genus 4.—**Cytheridea**, Bosquet.

- C. elongata**, G. S. Brady.—Bantry, Valentia, Dingle Bay, Aran, Clew Bay, Lough Foyle, Strangford Lough, Youghal (A. M. N.); Roundstone (G. S. B.); Dublin and Clifden Bay (B. & R.); Berehaven, Antrim coast, tide marks to 60 fathoms; Belfast Lough (S. M. M.).
- C. papillosa**, Bosquet.—Off Valentia in deep water, Westport (A. M. N.); Antrim coast, 15-60 fathoms; Belfast Lough, tide marks to 10 fathoms; off Great Skellig, Co. Kerry (S. M. M.).
- C. punctillata**, G. S. Brady.—Off Valentia (A. M. N.); Dublin Bay, 3-4 fathoms (B. & R.); off Great Skellig (S. M. M.).
- C. stigmosa**, Brady & Norman.—The types were dredged in deep water off Valentia in 1870 (A. M. N.). It has not as yet been found elsewhere.
- C. torosa** (T. R. Jones).—In brackish waters, Newport and Westport Bays, Co. Mayo (A. M. N.).
- C. lacustris** (G. O. Sars).—Lough Neagh (A. M. N.).
- C. subflavescens**, G. S. Brady.—Off the coast of Antrim, 15-72 fathoms; Belfast Lough, 10 fathoms; Donaghadee, tide marks (S. M. M.).
- C. sorbyana**, T. R. Jones.—In 112 fathoms, 30 miles off Valentia, in 1870 (A. M. N.); off the Great Skellig (S. M. M.).

Genus 5.—**Eucythere**, G. S. Brady,

- Eucythere declivis** (Norman).—Bantry, Valentia, Dingle Bay, Aran, Lough Foyle, Strangford Lough (A. M. N.); Galway and Roundstone (G. S. B.); Donegal Bay (E. C. Davison); Kerry coast, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).
- Var. **argus**, G. O. Sars.—In shell-sand, Galway Bay (Prof. Rowney); Dublin and Westport Bays (B. & R.).
- E. anglica**, G. S. Brady.—Westport, Co. Mayo (A. M. N.); Clifden Bay to 6 fathoms (B. & S.). This is the same form which was subsequently called by Brady and Robertson var. *prava*; they apparently having forgotten that the former had already described it under the name *E. anglica* in an appendix to his monograph (p. 475). I am disposed to regard it as a good species.

Genus 6.—**Krithe**, Brady, Crosskey, & Robertson.

- Krithe bartonensis** (T. R. Jones).—Off Valentia, Youghal (A. M. N.); Donegal (E. C. Davison); Aran, Roundstone, and Birturbuy Bays (G. S. B.); off the Great Skellig (S. M. M.).
- K. producta**, G. S. Brady.—“Porcupine,” 1869, station 19, lat. 54° 53' N., long. 10° 56' W., to the west of Donegal, in 1,350 fathoms; station 20, lat. 55° 11' N., long. 11° 31' W., in 1,443 fathoms, and station 34, south of Berehaven, lat. 49° 51' N., long. 10° 12' W., in 75 fathoms. In this last locality only a single valve was found. It is a species of very wide distribution in very great depths in the ocean.

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" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
" " 6	Charlock Spraying.
" " 7	Fluke in Sheep.
" " 8	Timothy Meadows.
" " 9	The Turnip Fly.
" " 10	Wireworms.
" " 11	Prevention of White Scour in Calves.
" " 12	<i>Out of print.</i>
" " 13	Contagious Abortion in Cattle.
" " 14	Prevention of Potato Blight.
" " 15	Fertilizers and Feeding Stuffs Act, 1893, and (Amendment) Regulations, 1904.
" " 16	Sheep Scab.
" " 17	The Use and Purchase of Manures.
" " 18	Swine Fever.
" " 19	Early Potato Growing.
" " 20	Calf Rearing.
" " 21	Diseases of Poultry :—Gapes.
" " 22	Basic Slag.
" " 23	Dishorning Calves.
" " 24	Care and Treatment of Premium Bulls
" " 25	Fowl Cholera.
" " 26	Winter Fattening of Cattle.
" " 27	Breeding and Feeding of Pigs.
" " 28	Blackleg, Black Quarter, or Blue Quarter
" " 29	Flax Seed.
" " 30	Poultry Parasites—Fleas, Mites, and Lice.
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" " 32	Rearing and Fattening of Turkeys.
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" " 34	The Revival of Tillage.
" " 35	The Liming of Land.
" " 36	Field Experiments—Barley.
" " 37	" " Meadow Hay.
" " 38	" " Potatoes.
" " 39	" " Mangolds
" " 40	" " Oats.
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" " 58	Sprouting Seed Potatoes.
" " 59	Seed Testing Station for Ireland.
" " 60	The Packing of Butter.
" " 61	The Care of Milk for Creameries.
" " 62	Plans for Creamery Buildings.

Krithe glacialis, Brady, Crosskey, and Robertson.—“One or two specimens of this species have been found in 110 fathoms off the Great Skellig. It does not appear to have been previously recorded in a recent state” (S. M. M.). Was *Krithe producta*, which is extremely variable, mistaken for it?

Genus 7.—**Loxoconcha**, G. O. Sars.

Loxoconcha impressa (Baird).—Apparently found all round the coast between tide marks—Bantry, Valentia, Dingle Bay, Aran; Ballyvaughan, Co. Clare; Westport, Lough Foyle, Strangford Lough, Youghal (A. M. N.); Galway, Birturbuy, and Roundstone Bays (G. S. B.); Dublin and Clifden Bay (B. & S.); Berehaven, Antrim coast, Belfast, and Donaghadee (S. M. M.); Newcastle (G. S. B.).

L. viridis (O. F. Müller).—This is not the *Cythere viridis* of Sars and of Brady, but the *Loxoconcha elliptica* of the latter author. It is a brackish water form. Westport and Newport (A. M. N.); Dundrum (G. S. B.).

L. guttata (Norman).—Bantry, Valentia, Dingle Bay, Aran, Killary Bay, Roundstone (A. M. N.); Dublin, Clifden, and Westport Bays, Lough Swilly and Mulroy Bay (B. & R.); Kerry coast, Antrim coast, and Belfast Lough (S. M. M.).

L. tamarindus (T. R. Jones).—Bantry, Valentia, Dingle Bay, Aran, Lough Foyle, Strangford Lough (A. M. N.); Galway and Roundstone (G. S. B.); Kerry coast, Dublin, Clifden, and Westport Bays (B. & R.); Antrim coast, Belfast Lough, and Donaghadee (S. M. N.). The Ostracod which Dr. Malcomson recorded under the name *Loxoconcha cuneiformis* was the male of this species.

L. multifora, Norman.—Valentia, Dingle Bay, Aran, Roundstone (A. M. N.); Clifden and Westport Bays (B. & R.); off Great Skellig, Antrim coast, and Belfast Lough (S. M. M.).

L. pusilla, Brady & Robertson.—Westport, Co. Mayo (A. M. N.); two miles N.E. of Muck Island, Co. Antrim, in 50 fathoms; and several places between tide marks in Belfast Lough and at Donaghadee (S. M. M.). Not as yet known outside the British Isles.

L. fragilis, G. O. Sars.—In 112 fathoms west of Valentia in 1870 (A. M. N.); off Great Skellig (S. M. M.).

Genus 8.—**Xestoleberis**, G. O. Sars.

Xestoleberis aurantia (Baird).—Tide marks Aran, Roundstone Renvyle, Co. Galway, Westport, Strangford Lough (A. M. N.); Berehaven, Dublin, and Clifden Bays and Lough Swilly (B. & R.); Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).

X. depressa, G. O. Sars.—Bantry, Valentia, Aran, Westport, Lough Foyle (A. M. N.); Birturbuy and Clifden Bays (B. & R.); Kerry coast, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).

X. labiata, Brady and Robertson.—Abundant among weeds at low water, Ballyvaughan, Co. Clare (A. M. N.).

Genus 9.—**Cytherura**, G. O. Sars.

- Cytherura gibba** (O. F. Müller).—Westport (A. M. N.); canal at Belfast (B. & R.). Dr. Malcomson states that it was taken four miles off the Gobbins, on the Antrim coast, in 60 fathoms. How did this brackish-water species get there? Dundrum (G. S. B.).
- C. cornuta**, G. S. Brady.—Bantry, Valentia, Ballyvaughan, Aran, Westport (A. M. N.); Dublin, Clifden, and Roundstone Bays (B. & R.); Berehaven, Antrim coast, and Belfast Lough (S. M. M.).
- C. sella**, G. O. Sars.—Valentia, Ballyvaughan, Aran, Westport, Lough Foyle (A. M. N.); Birturbuy and Clifden Bays, and Dublin (B. & R.); Berehaven, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).
- C. acuticostata**, G. O. Sars.—Bantry, Aran, Westport (A. M. N.) Birturbuy and Clifden Bays (B. & R.); Kerry coast, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).
- C. striata**, G. O. Sars.—Bantry, Valentia, Dingle Bay, Aran, Birturbuy, Westport, Lough Foyle (A. M. N.); Dublin and Clifden Bays (B. & R.); Kerry coast, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).
- C. angulata**, G. S. Brady.—Bantry, Aran; "Porcupine," 1869, stat. 6, west of Shannon, in 90 fathoms (A. M. N.); Antrim coast and Belfast Lough (S. M. M.); Birturbuy Bay (B. & R.).
- C. producta**, G. S. Brady.—Bantry, Aran, Valentia, Lough Foyle, Westport, Strangford Lough (A. M. N.); Roundstone and Mulroy Bay (B. & S.); Kerry coast, Antrim coast, and Belfast Lough (S. M. M.).
- C. undata**, G. O. Sars.—Aran, Westport; "Porcupine," 1869, in 90 fathoms west of the Shannon (A. M. N.); Dublin, Clifden, and Birturbuy Bays (B. & R.); entrance to Bantry Bay, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).
- C. nigrescens** (Baird).—Everywhere between tide marks; also in the Laminarian zone and moderately deep water.
- C. simplex**, Brady and Norman.—Roundstone (A. M. N.); Birturbuy Bay (B. & R.); Belfast Lough (Malcomson, *vide* G. S. B.). I presume that it is this species which Dr. Malcomson himself thence recorded as *Cytherura propinqua*, and under that same name he records a species as being common at Berehaven.
- C. concentrica**, Brady, Crosskey, and Robertson.—Two specimens off Great Skellig, Co. Kerry (S. M. M.).
- C. similis**, G. O. Sars.—Dublin Bay, 3-4 fathoms (B. & R.); Berehaven, and Newcastle, Co. Down (G. S. B.).
- C. fulva**, Brady and Robertson.—Valentia, Westport (A. M. N.); Clifden Bay (G. S. B.); Berehaven, very common; Antrim coast and Belfast Lough (S. M. M.).
- C. clathrata**, G. O. Sars.—Antrim coast and Belfast Lough (S. M. M.). This is an arctic form which has been found as far north as Franz Josef Land.

Cytherura cellulosa (Norman).—Bantry, Valentia, Dingle Bay, Aran, Roundstone (A. M. N.); Dublin and Clifden Bays (B. & R.); Donegal and Newcastle (G. S. B.); Antrim coast and Belfast Lough (S. M. M.).

Genus 10.—**Cytheropteron**, G. O. Sars.

Cytheropteron latissimum (Norman).—Bantry, Valentia, Dingle Bay, Lough Foyle, Strangford Lough (A. M. N.); Antrim coast and Belfast Lough (S. M. M.).

C. nodosum, G. S. Brady.—In shell-sand from Roundstone (Dr. Alcock, *vide* Brady); Clifden Bay (B. and R.); Antrim coast, Belfast Lough, Kerry coast (S. M. M.).

C. punctatum, G. S. Brady.—Bantry, Valentia, Roundstone (A. M. N.); Clifden and Westport Bays (B. & R.); Antrim coast and Belfast Lough (S. M. M.).

C. crassipinnatum, Brady and Norman.—The types, and as yet only known specimens, were dredged by me in 1870, in 112 fathoms, off Valentia.

C. alatum, G. O. Sars.—Off Valentia in 80–112 fathoms (A. M. N.); off the Great Skellig, Co. Kerry, in 70–110 fathoms (S. M. M.).

C. læve, Brady & Norman.—A single valve dredged by the "Porcupine," 1869, in 1,366 fathoms, at station 19, lat. $56^{\circ} 11' N.$, long. $10^{\circ} 56' W.$, in the ocean west of Donegal Bay. Only two other valves are known. These were procured in the same expedition of the "Porcupine," station 41, lat. $49^{\circ} 4' N.$, long. $12^{\circ} 22' W.$, in 584 fathoms; this station was S.S.W. of the S.W. of Ireland, but outside the British area.

C. angulatum, Brady and Robertson.—Off Valentia, Roundstone (A. M. N.); off the Antrim coast in 60 fathoms (S. M. M.).

C. inflatum, Brady, Crosskey, and Robertson.—"Porcupine," 1869, station 19, lat. $54^{\circ} 33' N.$, long. $10^{\circ} 56' W.$, in the sea to the west of Donegal in 1,366 fathoms (A. M. N.).

C. montrosiense, Brady, Crosskey, and Robertson.—Roundstone Bay (B. & R.); rare off the Great Skellig (S. M. M.).

C. depressum, Brady and Norman.—Valentia, Aran, Roundstone, Westport, Lough Foyle (A. M. N.); Clifden and Galway Bays and Lough Swilly (B. & S.); Berehaven very common, Belfast Lough, and Donaghadee (S. M. M.).

Genus 11.—**Bythocythere**, G. O. Sars.

Bythocythere constricta, G. O. Sars.—Bantry, Valentia, down to 112 fathoms, Dingle Bay (A. M. N.); Dublin and Mulroy Bays and Lough Swilly (B. & S.); Antrim coast and Belfast Lough (S. M. M.).

B. turgida G. O. Sars.—Off Valentia (A. M. N.); Roundstone (B. & R.); Antrim coast and Belfast Lough (S. M. M.).

B. recta, G. S. Brady.—Roundstone (A. M. N.); Westport (B. & S.); Antrim coast and Belfast Lough (S. M. M.).

B. simplex (Norman).—Twenty-five miles off Valentia in 80 fathoms (A. M. N.); rare off Antrim coast and in Belfast Bay (S. M. M.).

Genus 12.—**Pseudocythere**, G. O. Sars.

Pseudocythere caudata, G. O. Sars.—Bantry, Valentia, Ballyvaughan, Aran, Strangford Lough (A. M. N.); Dublin and Birturbuy Bays (B. & R.); Berehaven, Antrim coast, Belfast Lough, and Donaghadee (S. M. M.).

Genus 13.—**Sclerochilus**, G. O. Sars.

S. contortus (Norman).—Valentia, Aran, Westport, Lough Foyle, Strangford Lough (A. M. N.); Dublin and Birturbuy Bays (B. & R.); off Great Skellig, Antrim coast, Donaghadee, and Belfast Lough (S. M. M.).

S. lævis, G. W. Müller.—

869. *Sclerochilus contortus* var. *abbreviatus*, Brady and Robertson, *Ann. & Mag. Nat. Hist.*, Ser. 4, vol. iii., p. 20 (separate copy), Pl. xx., figs. 15-16.

1894. *Sclerochilus lævis*, G. W. Müller, *Fauna und Flora des Golfes von Neapel. Die Ostrocoden*, p. 283, Pl. xvi., figs. 3, 8, 20, 23, 28.

The *Sclerochilus* described by Müller under the above names is clearly the same as that which Brady and Robertson regarded as a variety of *S. contortus*. I adopt Müller's views here, but am not confident that the species is a good one. I found it myself at Naples, and at Madeira, where it prevails rather than *S. contortus*.

Clifden Bay (B. & R.).

Genus 14.—**Cytherideis**, T. R. Jones.

Cytherideis subulata, G. S. Brady.—Valentia, Aran, Lough Foyle, Strangford Lough (A. M. N.); Dublin, Birturbuy, and Westport Bays (B. & R.); Antrim coast, Belfast Lough, Donaghadee (S. M. M.).

Genus 15.—**Cytherois**, G. W. Müller.

C. Fischeri (G. O. Sars).—Valentia, Aran, Ballyvaughan, Westport, Lough Foyle (A. M. N.); Dublin and Clifden Bays (B. & R.); Antrim coast and Belfast Lough (S. M. M.).

Fam V.—PARADOXOSTOMATIDÆ.Genus 1.—**Paradoxostoma**, S. Fischer.

Paradoxostoma variabile (Baird).—Bantry, Valentia, Aran, Ballyvaughan, Roundstone, Westport, Strangford Lough (A. M. N.); Dublin and Clifden Bays (B. & R.); Newcastle, Co. Down, and Dundrum (G. S. B.); Antrim coast and Belfast Lough (S. M. M.).

P. ensiforme, G. S. Brady.—Bantry, Valentia, Dingle Bay, Aran, Lough Foyle, Strangford Lough (A. M. N.); Donegal Bay (E. C. Davis); Dublin and Birturbuy Bays (B. & R.); Berehaven, Antrim coast, and Belfast Lough (S. M. M.).

- Paradoxostoma abbreviatum**, G. O. Sars.—Valentia Harbour, Dingle Bay, Aran, Roundstone, Lough Foyle (A. M. N.); Dublin Bay (B. & R.); Berehaven, Antrim coast, and Belfast Lough (S. M. M.).
- P. obliquum**, G. O. Sars.—Valentia Harbour, Aran, Westport, Lough Foyle (A. M. N.); Clifden Bay, Mulroy Bay, Lough Swilly (B. & R.); Berehaven, coast of Antrim, Belfast Lough (S. M. M.).
- P. Normani**, G. S. Brady.—Aran, Westport, Lough Foyle, Strangford Lough (A. M. N.); Roundstone Bay and Lough Swilly (B. & R.); Antrim coast and Belfast Lough (S. M. M.).
- P. pulchellum**, G. O. Sars.—Valentia, Aran, Ballyvaughan, Roundstone (A. M. N.); Mulroy Bay (B. & R.); Belfast Lough and Rockport, Co. Down (S. M. M.).
- P. hibernicum**, G. S. Brady.—Valentia, Aran, Ballyvaughan, Roundstone, Westport, Strangford Lough (A. M. N.); Clifden Bay and Lough Swilly (B. & R.); Berehaven, Rockport, Co. Down (S. M. M.).
- P. fasciatum**, Brady and Norman.—Clew Bay, 2-4 fathoms (A. M. N.).
- P. arcuatum**, G. S. Brady.—Roundstone (A. M. N.); Birturbuy Bay (G. S. B.); Clifden Bay (B. & R.).
- P. orchadense**, Brady and Robertson.—Berehaven, common (S. M. M.).
- P. flexuosum**, G. S. Brady.—Valentia, Aran, Roundstone, Westport (A. M. N.); Clifden Bay, Mulroy Bay, Lough Swilly (B. & R.); Berehaven, Antrim coast and Belfast Lough (S. M. M.).

Genus 2.—**Machærina**, Brady and Norman.

- Machærina tenuissima** (Norman).—Off Valentia; Roundstone and Killary Bays (A. M. N.); Belfast Lough (S. M. M.).

Section II.—MYODOCOPA.

Fam. I.—**ASTEROPIDÆ**.

Genus 1.—**Asterope**, Philippi.

- Asterope Marlæ** (Baird).—Valentia and Birturbuy Bay (A. M. N.); Mulroy Lough (B. & R.).
- A. elliptica**, Philippi.—Off Valentia, 1870 (A. M. N.).
- A. teres** (Norman).—Off Valentia, 1870, and Birturbuy Bay (A. M. N.); Mulroy Bay and Lough Swilly (B. & R.).

Fam. II.—**CYPRIDINIDÆ**.

Genus 1.—**Crossophorus**, G. S. Brady.

- Crossophorus Imperator**, G. S. Brady.—I quote the following note regarding this magnificent Ostracod from Professor Brady's and my monograph:—"The type specimen, a male, was dredged by the 'Challenger' Expedition, Stat. 168, which is a little to the east of New Zealand, lat. 40° 28' S., long. 177° 43' E., in 1,100 fathoms, bottom temperature 2° C. on grey ooze. The second specimen,

from which the animal is here described, and the drawings made, is a female, which apparently differs in no respect from the male except in sex, was procured by the 'Porcupine' Expedition in 1869 in the Atlantic, west of Donegal Bay, Ireland, Stat. 20, lat. $55^{\circ} 11' N.$, long. $11^{\circ} 31' W.$, in 1,443 fathoms, bottom temperature 37° Fahr. It is interesting to observe that though the specimens were found so very far apart the temperature of the water only differed by $1\frac{1}{2}$ degrees, since $2^{\circ} C.$ equals $35^{\circ} 6' Fahr.$ Owing to the great uniformity of temperature in the great depths of the oceans, I believe that it will be found generally, as experience is gained, that the deep water species have a much wider distribution than those which inhabit depths subject to alteration of temperature dependent upon atmospheric conditions.

Genus 2.—**Philomedes**, Lilljeborg.

Philomedes interpuncta (Baird).—Valentia, 1870, and Birturbuy Bay (A.M.N.); off White Head, Belfast Lough, 19 fathoms (S.M.M.).

P. MacAndrei (Baird).—Taken by the "Porcupine," 1869, at two stations off the south-west of Ireland, viz., Stations 3 and 7, in depths of 722 and 159 fathoms; and also at Station 18, off Mayo, in 183 fathoms.

Fam. 3.—**Sarsiellidæ**.

Genus.—**Sarsiella**, Norman.

Sarsiella capsula, Norman.—The form we described in our monograph as *Nematohamma obliqua* is, according to the observations of Herr G. W. Müller, who has found the genus *Sarsiella* to be not uncommon at Naples, the male of *Sarsiella capsula*. Both sexes were dredged by me in 1870, in 112 fathoms, off Valentia, and the male also off Birturbuy Bay.

Fam. 4.—**Halocypridæ**.

Genus 1.—**Conchoëcia**, Dana.

Conchoëcia Haddoni, Brady and Norman.—Captured by Professor Haddon in a tow-net sunk to 200 fathoms, 40 miles off Achill Head. These are the types.

C. magna, Claus.—"Oceana," Station 1,¹ 270 fathoms; Station 4, 150 fathoms.

¹ The "Oceana" had four days tow-netting in very deep water; the first and fourth of these were within the British area, and I shall term them Stations 1 and 4. See Brady, *Ann. & Mag. Nat. Hist.* (7) vol. iii., 1903, p. 337.

Station I Lat. $52^{\circ} 4' 5' N.$, long. $12^{\circ} 27' W.$, in 270 to 650 fathoms.

Station IV. Lat. $52^{\circ} 20' N.$, long. $15^{\circ} 7' 9' W.$, 150–560 fathoms. The remaining days were spent working over depths beyond 1,500 fathoms.

- ? **Conchœcia maxlma**, Brady and Norman.—“Oceana,” Station 1, 374 fathoms; but marked with a query.
- C. Imbricata**, G. S. Brady.—“Oceana,” Station 1, 620 fathoms; Station 4, 510 and 560 fathoms.
- C. hyalophyllum**, Claus.—“Oceana,” Station 1, 620 fathoms; Station 4, 510 and 560 fathoms.
- C. spinirostris**, Claus.—“Oceana,” Station 4, 150 fathoms.

Genus 2.—**Paraconchœcia**, Claus.

- Paraconchœcia oblonga**, Claus.—“Oceana,” Station 1, in 464, 620, and 650 fathoms.
- P. spinifera**, Claus.—“Oceana,” Station 1, in 270 fathoms; and Station 4, 150 fathoms.

Genus 3.—**Microconchœcia**, Claus.

- ? **Microconchœcia Clausii**, G. O. Sars.—“Oceana,” Station 1, 270 fathoms, recorded with a query.

Genus 4.—**Conchœcilla**, Claus.

- Conchœcilla lacerta**, Brady and Norman.—“Oceana,” Station 4, 510 and 560 fathoms.
- C. daphnoides**, Claus.—A single specimen, taken by Professor Haddon in the same gathering as *Conchœcia Haddoni*.

Section III.—CLADOCOPA.

Fam. I.—**POLYCOPIDÆ.**

Genus 1.—**Polycope**, G. O. Sars.

- Polycope orbicularis**, G. O. Sars.—Off Valentia, Dingle Bay, Birturbuy Bay, Clew Bay (A.M.N.); Roundstone, in shell-sand (Dr. Alcock); Lough Swilly (G.S.B.); off Great Skellig in Kerry, Antrim coast and Belfast Lough (S.M.M.).

Genus 2.—**Polycopsis**, G. W. Müller.

- Polycopsis compressa**, Brady and Robertson.—On an oyster bed in Clifden Bay, in 4-6 fathoms (B. & R.).

Section IV.—PLATYCOPA.

Genus 1.—**Cytherella**, Bosquet.

- Cytherella abyssorum**, G. O. Sars.—Malcomson records this under the name *C. scotica*, Brady, as taken in 60 fathoms, four miles east of the Gobbins, on the coast of Antrim.
- C. serrulata**, Brady and Norman.—Two valves in the “Porcupine,” dredging from 1,366 fathoms west of Donegal Bay (Station 19). Berkhamsted, Herts.

THE DISTRIBUTION OF FUMITORIES IN IRELAND.

BY R. LLOYD PRAEGER.

MR. H. W. PUGSLEY'S revision of the British Capreolate Fumitories in 1903¹, showed that much confusion had arisen in the naming of these plants in the British Islands. An examination which Mr. Pugsley kindly made of the Fumitories in my own herbarium in the same year proved that the distribution of the various forms as given in "*Irish Topographical Botany*" was not to be relied upon. I published² in the *Irish Naturalist* both the additions and subtractions which this examination entailed. Mr. Pugsley's subsequent re-naming of the series preserved in the National Herbarium reduced the previously existing Irish list to a state of chaos. Miss Knowles has published in this Journal³ the positive results of this revision, and has left to me the equally important task of publishing the negative results—*i.e.*, the withdrawal of published records now known to be erroneous. Since it was clear that the Irish list must be built up again from its foundation, I issued a circular in June of last year asking for dried specimens of Irish Fumitories, which Mr. Pugsley had kindly undertaken to examine. This appeal met with a satisfactory response; but unfortunately several correspondents insisted on sending up "fresh" specimens, which generally arrived in a condition so far from fresh as to be totally useless. Mr. Pugsley has now examined the series which I succeeded in getting together. For contributing to this series or for supplying information I offer my best thanks to J. Adams, M.A., J. T. Abraham, W. A. Barnes, Captain Barrett-Hamilton, B.A., F.Z.S., Rev. S. A. Brenan, B.A., N. Colgan, M.R.I.A., N. Carrothers, J. H. Davies, Miss M. J. Delap, G. J. Fogerty, P. H. Grierson, Miss S. Grubb, Rev. Canon Hartley, M.A., Mrs. Frank Joyce, Mrs. Leebody, C. J. Lilly, D.I., T. A. P. Mapother, D.L., Rev. E. S. Marshall, M.A., F.L.S., R. D. O'Brien, Miss Charlotte O'Brien, R. A. Phillips, Miss Reynell, Miss Rosa Smith, A. Somerville, B.Sc., S. A. Stewart, A.L.S., W. N. Tetley, W. J. C. Tomlinson, Rev. C. H. Waddell, B.D.

¹ *Journ. Bot.*, xl., pp. 129-136, 173-181, tab. 436.

² *Irish Nat.*, xiii., pp. 4, 11. 1904. ³ *Irish Nat.*, xiii., pp. 33-36. 1904.

I shall in the first place list all the withdrawals which must be made from the records given in "Irish Topographical Botany"; and subsequently proceed to the more congenial constructive work of giving, in the usual form, a revised list of localities for each of the several Fumitorics known to occur in Ireland. This will serve as a groundwork on which a more extended list may by degrees be built up.

WITHDRAWALS FROM "IRISH TOPOGRAPHICAL BOTANY."

Fumaria capreolata, L.

Withdraw—none.

F. Boræi, Jord.

- 10. Tipperary N. Withdraw.
- 18. King's Co. Withdraw.
- 20. Wicklow. Withdraw Shillelagh.
- 21. Dublin. Withdraw.
- 24. Longford. Withdraw
- 25. Roscommon. Withdraw Athlone.
- 28. Sligo. Withdraw.
- 31. Louth. Withdraw.

F. confusa, Jord.

- 7. Tipperary S. Withdraw.
- 11. Kilkenny. Withdraw.
- 13. Carlow. Withdraw.
- 30. Cavan. Withdraw.

F. muralis, Souder.

- 7. Tipperary S. Withdraw.
- 14. Queen's Co. Withdraw.
- 15 Galway S.E. Withdraw.
- 18. King's Co. Withdraw.
- 22. Meath. Withdraw Oldcastle.
- 31. Louth. Withdraw.

F. densiflora.

Withdraw—none.

F. officinalis, L.

- 13. Carlow. Withdraw.
- 15. Galway S.E. Withdraw Kilcolgan.
- 22. Meath. Withdraw Slieve Breh.
- 31. Louth. Withdraw Termonfeckin.

Of the new records for Fumitorics summarized or first published in my annual lists of additions to *I.T.B.*, none are to be withdrawn, as the plants referred to have in all cases passed through Mr. Pugsley's hands.

The material available for the reconstruction of the Irish list is still scanty. By far the most important published contribution is the revised list of the National Herbarium Fumitories, as published by Miss Knowles. More than half of the plants in this collection—54 out of 93—are of my own collecting, and it is chiefly on the revision of these that the withdrawal or confirmation of records published in “*Irish Topographical Botany*” is based. Next in order come Fumitories collected by Messrs. Colgan, Scully, Phillips, Marshall, and others, submitted to Mr. Pugsley by the finders, and most of them published subsequently in this Journal (see my annual “*Additions to Irish Topographical Botany*” for the last four years). Finally, we have the unpublished material arising from the response to my circular of last June. This constitutes a tolerably large series, embracing about a hundred gatherings; but the stations represented are not at all evenly distributed over the country. Ulster claims over one-half of the total, and the counties of Antrim and Down have between them the bulk of the Ulster records. Altogether, only about twenty out of the forty divisions are represented in the series.

So many of the undermentioned records are based on specimens in the National Herbarium, as published in this Journal by Miss Knowles last year, that for the sake of brevity I have indicated these by the initials *N.H.*, without repeating dates or the names of finders. To other published records I have added references. The initial *P* stands for my own name,

***F. capreolata*, L.**

8. Limerick. Foynes, in several stations—*N.H.*, &c.
9. Clare. Several stations—*N.H.*
12. Wexford. Near Wexford—*I.T.B.*
15. Galway S.E. Castle Taylor, '50 (A. G. More)—*Herb. S.* and *A.M.*
20. Wicklow. Greystones—*N.H.*
21. Dublin. Locally abundant—Colgan, *Fl. Dublin.*
27. Mayo W. Achill I., '04—Praeger, *I.N.*, xiii., 282.
28. Sligo. Strandhill—*I.T.B.*, and in 1904—Mrs. Leebody.
31. Louth. Greenhills near Drogheda, '04—Miss Rosa Smith.
34. Donegal E. Greencastle, '04—Mrs. Leebody.
38. Down. Many stations—*N.H.*, *Herb. Belf. Nat. Hist. and Phil. Soc.*, and *P.*
39. Antrim. Ballymoney, '04—D. C. Campbell; Larne, '04—N. Carrothers; Islandmagee, '04—C. J. Lilly; Carrickfergus—*N.H.*

The above list replaces for the present a considerably larger one in *I.T.B.* But from the fact that those records in the *I.T.B.* list which have been checked prove to be all correct, we may infer that this plant has usually been correctly diagnosed in Ireland, and without much fear of error we may accept the unverified existing records. This will add to the above list divisions 1, 2, 3, 4, 5, 6, 7, 10, 14, 16, 17, 35, 36, 37, and 40.

F. purpurea, Pugsley.

1. Kerry S. Castlegregory, 1888-1902—Scully, *I.N.*, xii., 113; Killarney, '02—E. S. Marshall.
2. Kerry N. Killarney and Ballyheigue, '02—Scully, *I.N.*, xii., 113.
12. Wexford. East of Wexford, '97—E. S. Marshall.
20. Wicklow. Bray Head—*N.H.*
21. Dublin. Rush, '02—Colgan, *Fl. Dublin*; Rathfarnham, '94—P.
31. Louth. Dunleer, '00—*N.H.*
36. Tyrone. Donemana, '04—Mrs. Leebody; Strabane, '96—*N.H.*
38. Down. Lenaderg, '04—J. H. Davies; near Shaw's Bridge, '04—N. Carrothers.
39. Antrim. Antrim, '04—W. J. C. Tomlinson; Glenmore—*N.H.*

This plant has been added to the Irish list since the publication of "Irish Topographical Botany."

F. Boræi, Jord.

2. Kerry N. Near Headford Junction, '03—Scully, *I.N.*, xiii., 77; Ballymalis Castle, '88—Scully, *I.N.*, xii., 113.
4. Cork Mid. Currabinny, '03 (var. *serotina*)—Scully, *I.N.*, xiii., 118.
5. Cork E. Youghal—*N.H.*
6. Waterford. Coolfin and Baylough, '04—W. W. Flemyng; Cappoquin (*Herb. Brit. Mus.*)—H. W. Pugsley; Ardmore—*N.H.*
7. Tipperary S. Carrick-on-Suir—*N.H.*
8. Limerick. Corbally and Castleconnell, '04—R. A. Phillips; Limerick, '92 (H. and J. Groves)—*I.N.*, xiii., 11.
9. Clare. Delmege's Glen, '04 (var. *serotina*)—R. D. O'Brien; Parteenalax—*N.H.*
10. Tipperary N. Ballina, '04—R. A. Phillips.
11. Kilkenny. Granny—*N.H.*
12. Wexford. Near Wexford, '97, Crossbridge, '96—*N.H.*; near Gorey, '97 (var. *ambigua*)—E. S. Marshall.
13. Carlow. St. Mullins and Goresbridge—*N.H.*
21. Dublin. Malahide, '04—Miss Knowles; Old Bawn, '03—P.; Ballybrack, '02—Colgan, *Fl. Dublin*; Portmarnock—*N.H.*
22. Meath. Oldecastle—*N.H.*
34. Donegal E. Bridge End, '04—Mrs. Leebody ("very abnormal, simulating *F. purpurea* in the length of the bracts"—H. W. Pugsley).
38. Down. Comber, '04—N. Carrothers; Ballylesson, '72 (S. A. Stewart)—*Herb. Belf. Nat. Hist. and Phil. Soc.*
39. Antrim. Antrim, '04—J. Adams; Malone, '92—S. A. Stewart.

Although N. Tipperary, King's Co., Dublin, Longford, Sligo, and Louth, disappear from the list on the "Irish Top. Bot." evidence, and only the Carlow stations of that list are confirmed, the new list shows that this is a common plant, restores two of the withdrawn counties, and adds nine new counties to the distribution list. Little faith can be placed on the few unchecked records in *I.T.B.*

F. confusa, Jord.

1. Kerry S. Valencia, '04—Miss Delap; Brandon and Stradbally—Scully, *I.N.*, xii., 113.
2. Kerry N. Banna, '02, Spa and Fenit, '88—Scully, *I.N.*, xii., 113; Killarney (*Herb.* Scully)—H. W. Pugsley.
3. Cork W. Schull, '94—R. A. Phillips.
4. Cork Mid. Rochestown, '04—Miss H. Martin; Capwell, '89—R. A. Phillips; Currabinny, '03—E. S. Marshall.
5. Cork E. Fermoy—*N.H.*
6. Waterford. Tramore, '02—H. W. Lett and C. H. Waddell; Portlaw, '04—W. W. Fleming; Ardmore—*N.H.*
8. Limerick. Foynes, '04—Miss Knowles; Castleconnell, '04—R. A. Phillips.
9. Clare. Corofin—*N.H.*; Parteenalax, '04—R. D. O'Brien.
10. Tipperary N. Nenagh and Cloughjordan—*N.H.*
15. Galway S.E. Near Loughrea, '04—Mrs. Joyce; Kinvarra and Kilcolgan—*N.H.*
17. Galway N.E. Oranmore, North of Tuam, Bellahillan bridge—*N.H.*
18. King's Co. Edenderry—*N.H.*
20. Wicklow. Shillelagh and Bray—*N.H.*
21. Dublin. Many stations—Colgan, Druce, *N.H.*, and P.
22. Meath. Moynalty, '03—Barnes; Oldcastle and Slieve Brehn—*N.H.*
24. Longford. Ballymahon—*N.H.*
25. Roscommon. Kiltewan, '97 (T. A. P. Mapother)—*Herb.* S. & A. M. Athlone (two stations)—*N.H.*
27. Mayo W. Achill I., '04—P., *I.N.*, xiii., 282; Clare I., '03—P., *I.N.*, xii., 288.
28. Sligo. Rosses Point, '04—Mrs. Leebody; Strandhill, '04—Miss Knowles.
31. Louth. Ballymakenny and near Drogheda, '04—Miss Rosa Smith; Boynemonth, '96—P., *I.N.*, xiii., 11; Dunany—*N.H.*
33. Fermanagh. Enniskillen, '02—J. T. Abraham and F. M'Cullagh.
34. Donegal E. Greencastle, '04—Mrs. Leebody.
36. Tyrone. Donemana, '04—Mrs. Leebody; Omagh and Strabane—*N.H.*
37. Armagh. Portadown, '04—Miss M'Ardle.
38. Down. Many stations—N. Carrothers, J. H. Davies, S. A. Stewart, W. J. C. Tomlinson, C. H. Waddell, *N.H.*, and P.

39. Antrim. Cushendun, '04—S. A. Brenan; Malone, '92, and Rathlin, '82—S. A. Stewart.
40. Londonderry. Bellarena, '04—Mrs. Leebody.

S. Tipperary, Kilkenny, Carlow, and Cavan, disappear for the present from the list, but on the other hand six divisions are added in the new list, which is thus already more complete than the old one in records for this common plant. Most of the unchecked records of *I.T.B.* are probably correct

F. confusa, Jord., var. **hibernica**, Pugsley *in litt.*

2. Kerry N. Brandon village, Ballinskelligs, and Castlegregory (*Herb. Scully*)—H. W. Pugsley.
10. Tipperary N. Cloughjordan, '00—P.
13. Carlow. Milford—*N.H.*
18. King's Co. Clara—*N.H.*
20. Wicklow. Kilcoole—*N.H.*
21. Dublin. Rush bulb farm, '04—Miss Knowles; Killiney, Skerries, Portrane (*Herb. Colgan*)—H. W. Pugsley; Dunsink—*N.H.*
22. Meath. Moynalty, '04—W. A. Barnes.
24. Longford. Granard—*N.H.*
25. Roscommon. Kiltewan, '90—T. A. P. Mapother.
27. Mayo W. Clare Island, '03—P., *I.N.*, xii., 288.
28. Sligo. Strandhill, '97 (P.)—*Herb. S.* and A. M.
29. Leitrim. Mohill, '00—A. Somerville.
31. Louth. Ardee, '04—P. H. Grierson; Ballymakenny, '04—Miss Rosa Smith; Termonfeckin—*N.H.*
34. Donegal E. Bridge End, '04—Mrs. Leebody.
36. Tyrone. Dungannon, '04—Mrs. Leebody.
38. Down. Many stations—N. Carrothers, Hugh Robinson. S. A. Stewart, W. J. C. Tomlinson, C. H. Waddell, and P.
39. Antrim. Drain's Bay and Island-magee, '04—C. J. Lilly.
40. Londonderry. Bellarena, '04—Mrs. Leebody.

Mr. Pugsley proposes this name, which he will shortly publish, for a form which in Ireland appears to be almost as widely distributed as the type, although it does not appear to have been as yet collected outside this island. Its most striking character is the dark-tipped corolla, which in its coloration simulates *F. Borai*.

F. densiflora, DC.

17. Galway N.E. Frequent around Tuam—*I.T.B.*
21. Dublin. Finglas and Portmarnock—*I.T.B.*
22. Meath. Moynalty, '04—W. A. Barnes.
29. Leitrim. Mohill, '00—*I.T.B.*
37. Armagh. N.E. of Armagh, '92—*I.T.B.*

The distribution of this species stands, on revision, as published in *Irish Top. Bot.*, with the addition of Meath to the list.

F. officinalis, L.

5. Cork E. Queenstown—*N.H.*
7. Tipperary S. Five stations—*N.H.*
8. Limerick. Foynes—*N.H.*
9. Clare. Corofin, '04—G. J. Fogerty; Parteenalax, '04—R. D. O'Brien.
10. Tipperary. Nenagh and Cloughjordan—*N.H.*
12. Wexford. Enniscorthy—*N.H.*
14. Queen's Co. Near Graigue, '98—P.; Maryborough and Cullenagh—*N.H.*
17. Galway N.E. Dunmore—*N.H.*
18. King's Co. Edenderry, '96—P., *I.N.*, xiii., II.
19. Kildare. Straffan, '04—Miss Knowles; Kilcock and Kilkee Castle—*N.H.*
21. Dublin. Greenhills, '04, and Old Bawn, '03—P.; Baldoyle, Sandymount, Rathfarnham—*N.H.* Frequent—Colgan, *Fl. Dublin.*
22. Meath. Moynalty, '04—W. A. Barnes; Drumcondra, '04—P. H. Grierson; Oldcastle, '96—P.; Bective—*N.H.*
23. Westmeath. Drinmore and Knock Drin—*N.H.*
25. Roscommon. Kiltewan, '90—T. A. P. Mapother; Athlone—*N.H.*
30. Cavan. Mount Nugent—*N.H.*
31. Louth. Ardee, '04—P. H. Grierson; near Drogheda, '04—Miss Rosa Smith; Ardee bog and Dunleer—*N.H.*
34. Donegal E. Bridge End and Shantallon, '04—Mrs. Leebody.
36. Tyrone. Ardtrea, '01—S. A. Brennan.
37. Armagh. Castor's Bay, '96 (Waddell)—Watson B.E.C., 1902-3; Lurgan, '92—P.
38. Down. Many stations—N. Carrothers, S. A. Stewart, C. H. Waddell, *N.H.* and P.
39. Antrim. Near Larne, '04—C. J. Lilly; Glenmore, '95 (J. H. Davies)—*Herb.* S. A. Stewart.

Of the stations given in *I.T.B.*, thirteen are confirmed and four rejected. The new list leaves only six divisions of the old list unaccounted for, and these may be provisionally accepted as correct.

[F. Vaillantii, Loisel.

8. Limerick. Limerick, '99—P. Casual].

[F. parviflora, Lam.

4. Cork Mid. Old Botanic Gardens—*N.H.* Casual or introduction].

As regards *F. muralis*, Sonder, for which fourteen divisions were listed in *I.T.B.*, on the authority of Colgan, Corry, Marshall, Phillips, Stewart, Waddell, and myself (most of the plants having been named by critical botanists), every one

of these plants which can at present be checked (eight out of eighteen) proves, according to Mr. Pugsley, to be incorrectly named. He states that this plant appears to be extremely rare in the British Isles, former records resting on a misconception of its identity. Till further information is forthcoming it appears wise to withhold it from the Irish list.

NOTES.

BOTANY.

Further note on the Vitality of Seeds

Can seeds which have absorbed water and have swelled, be again dried up and afterwards germinate? Or, is this absorption of water and consequent swelling up to be regarded as the first stage in germination, and if the seed be now dried up will it lose its vitality? To settle this question, I took a number of dry seeds of Pea, Barley, Flax, Red Clover, and Swede, and soaked them in water—the Barley for 48 hours, the others for 24 hours. They were then taken out and allowed to dry up in the laboratory. When thoroughly dry they were put in a pot and germinated in the usual way with the following results:—96 per cent. of the Peas germinated, 73 per cent. of the Barley, 93 per cent. of the Flax, 65 per cent. of the Red Clover, and 87 per cent. of the Swede, so that the soaking and drying seems to have had little effect on them. I have lately found that no species of seed when in the swelled condition as the result of absorbing moisture can survive being subjected to a temperature of -190°C. , (-310°F.) for 6 hours.

J. ADAMS.

Royal College of Science, Dublin.

ZOOLOGY.

An Irish Enteropneust.

A new species of *Dolichoglossus* is described by Mr. W. M. Tattersall in the British Association Report, 1904, pp. 603–604.

This is the first Enteropneust which has been recorded from British waters. It was discovered by Mr. Farran in a dredging from Ballinakill Harbour, Co. Galway, and later on other specimens were obtained by dredging in a mixture of wet coarse sand and mud at low tide. This interesting addition to the Irish fauna will also be more fully dealt with in the Department of Agriculture's Report.

A Cuckoo and its egg.

A farmer near here, whom I know well, was witness a few days since to the Cuckoo's act of introducing its egg into a Titlark's nest. He has given me the following particulars, and I have seen the spot where the scene took place. On the 23rd May he was walking in one of his fields, and noticed a Cuckoo flying over a small clump of furze bushes. It hovered round and round a particular spot, and then flew away a short distance. He then walked up and found in the spot, just beneath where the bird was circling, a Titlark's nest with three eggs. Then hiding behind a fence quite near, he watched the Cuckoo, which returned in a few minutes. It perched some few yards from the nest, laid its egg on the ground, and carried it in its bill to the Titlark's nest, and placed it therein. One of the three eggs in the nest he saw in its bill after it left the nest, and this it left on the ground quite near, and when he went up to look at the nest after the bird had flown away, he found the Titlark's egg broken in two and the contents on the ground. The Cuckoo's egg, which is now in my collection, differs considerably in colour from those of its foster parents. It is a good bit larger than the other eggs, but yet, after all, would hardly attract the notice of the real owner of the nest either from its size or colour.

I have every confidence in the man who gave me the above information. He is a most reliable observer.

WILLIAM W. FLEMING.

Coolfin, Portlaw.

Quails in Co. Dublin.

It may interest some readers to know that Quails have appeared this year in our neighbourhood. I heard one or two on Saturday last, 20th May, and I believe that they have also been heard near Swords. I have not heard one in Ireland for the ten years preceding. Mr. Moffat's theory as to their appearance in dry seasons seems highly probable.

CHARLES W. BENSON.

Balbriggan.

Quails in Co. Down.

Mr. Joseph Watson, a gentleman who lives a couple of miles outside Lurgan on the Co. Down side, has informed me that on two occasions recently he heard in his neighbourhood a Quail. Mr. Watson is quite positive in his statement. The particular place where he heard it was in former years a famous place for these birds; he remembers as a boy seeing and hearing them there in hundreds.

WM. M'ENDOO.

Ballymore Rectory, Co. Armagh.

Turnstones on Lough Neagh.

While on Ram's Island, Lough Neagh, on May 18th, my attention was attracted to a small flock of birds, two of which were strange to me. They were flying with about four Dunlins (*Tringa alpina*). I got within about twenty yards of them as they sat on a stone that was washed by the small waves. They were Turnstones (*Streptopelia interpres*), birds which have never been found breeding yet in the United Kingdom. Mr. Patterson tells me they were observed there about two years ago by him. (See *Irish Nat.*, 1902, vol. xi., p. 221.)

E. L. L. McCLINTOCK.

Crumlin, Co. Antrim.

Tufted Duck breeding on Lough Conn.

I have the pleasure of noting that the Tufted Duck has extended its breeding range to Lough Conn this season, where, a few days ago, my friend Mr. S. Scroope observed several pairs of adult birds on the lake, and found one nest containing eleven eggs. This is the first season that they have been met with on this lake in summer.

ROBERT WARREN.

Moyview, Ballina.

Wild Cats formerly indigenous in Ireland.

In reply to Mr. Warren's remarks in last month's *Irish Naturalist*, I think few will agree with him in treating so lightly the discovery of semifossil bones of a species of wild cat in a cave in the Co. Clare, though we may well concede that it is extremely unlikely that any now survive here. Even if it were possible to prove a negative, the non-survival of any animal would not in the slightest degree affect the question of its former presence. I suppose we are all agreed that no Jennings now survive despite of the presence of their bones in a Sligo cave. Mr. Warren discounts the old fisherman's story by a curious inversion of argument. Seeing, he says, that in most parts of Ireland trapping is frequent, and, so far as we know, has not resulted in the capture of wild cats, therefore in a thinly populated mountain district where no traps are used, and where cats are traditionally stated to have been numerous some 200 years since, feeding on fish, some remnants of the race may still exist. So far I follow him, but fail to see his further inference that the story must therefore be without foundation. To be sure, if any survive they will long ago, as they have had to do elsewhere, have taken to other food, for salmon and white trout are not now in such vast abundance as we know they were in the rivers of the North of Ireland even 150 years ago. In 1776, at one haul of a net in the Bann, 1,452 salmon were landed.¹ I wonder, indeed, that a naturalist like Mr. Warren does not grasp the verisimilitude of the story. The teeming

¹ "Notes on Nets," Hon. and Rev. Charles Bathurst.

supply of salmon might well be attended by a commensurate abundance of seals and otters, which even yet are numerous in Donegal: but if there were no foundation for the tradition, the gratuitous introduction of cats in the story, to prey upon the remnants of the otter's feast, would argue a fecundity of imagination in the old man of no mean order. It reminds one of what Humboldt tells of the habits of the puma on the banks of the upper reaches of the Orinoco. Is not the predilection of the domestic cat for fish a survival of a time when that food was abundant? May I incidentally point out as suggestive that some topographical names in very uninhabited districts of Ireland refer to the cat? Coom-cat-quin is the designation of a wild tarn embosomed in the mountains which border the Bay of Kenmare, near Sneem. A wilder solitude more difficult of access does not exist I think in Ireland. Carn-na-gat on Slieve Beagh, and another in Antrim, derive their appellations, says Joyce, "from having been the resorts of wild cats."

The other portion of the old man's story is plainly reliable; for remains of deer trenches and palisades, such as he described, accompanied sometimes, to my own knowledge, by skulls and antlers, have been found in Irish bogs. I note, indeed, that Mr. Warren apparently uses the present instead of the past tense, but this must surely be a printer's error ("if wild cats are"); otherwise if red deer and wild cats "are" very plentiful in Donegal, specimens of the former may equally be expected to be met with about Muckish mountain. But as they are not, are we to infer that they also never existed, and the whole narrative is imaginary?

WM. F. de VISMES KANE.

Drumreaskie, Monaghan.

When writing on the supposed Wild Cat in Ireland, I was under the mistaken impression that only one set of bones had been found in the Clare caves, and therefore could not accept this one instance as proof that the animal had been a native. However, since then, my friend Mr. Ussher informs me that the bones of cats were found in *several* cases, which I readily acknowledge, proves that in ancient times some species of Wild Cat did exist in Ireland as a living contemporary of Mammoth, Cave Bear, and Arctic Lemming.

But as no evidence has as yet been forthcoming to prove the existence in a living state in Ireland of any species of wild cat, I still adhere to the opinion that no specimen will ever be obtained.

There have been many reports of wild cats and weasels being *seen* and *killed*; but why, I ask, do not the captors send forward specimens in the flesh to be identified?

I beg to correct a printer's error in my notes on the Supposed Wild Cat in Ireland (p. *supra*): instead of the supposed Irish Wild Cat being "sent to me" by the English naturalist, it was direct to the Museum it was sent, probably to the late A. G. More.

ROBERT WARREN.

Moy View, Ballina.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four young Badgers from Mr. W. W. Despard, a Kingfisher from Mrs. Nixon, two Rudd from Mr. J. Godden, and a Long-eared Owl from Messrs. C. and J. Freeman. Four Yellow Baboons, pairs of Teal, Pintails, Shovellers, and Wigeon, and a pair of Axolotls have been purchased. The alteration in the out-door aviary, to prepare it for the reception and proper exhibition of the Monkeys and Parrots, is making satisfactory progress.

BELFAST NATURALISTS' FIELD CLUB.

MAY 20.—A party of over seventy members met at the G.N.R. station, and took the 11.15 train for Donaghmore. They were joined *en route* by other members, and at Dungannon by a party belonging to the newly-formed Tyrone Field Club. Arriving at Donaghmore, the party, now numbering over one hundred, and under the leadership of Mr. Bradley, of the local Club, walked to the old cross of this village. The Rev. Mr. Latimer having briefly described the cross, a move was made to the graveyard, in front of which the cross stands. Mr. Brown then conducted the party over his soap-works. A start was now made for Dungannon, and while some of the party took the train the majority walked along the old road, a distance of about two and a half miles, which yielded a large number of wild flowers to the botanists. On arriving at Dungannon, the party proceeded up the hill to the site of O'Neill's Castle, of which Mr. James M. Hamilton, Town Clerk, gave a brief account. The party proceeded to Northland House, the seat of the Earl of Ranfurly, who had kindly granted permission to the Club to visit the park, and also to inspect some of the curios which he had brought with him from New Zealand and adjacent islands. At 5.30 the members assembled at the Northland Arms Hotel. After tea a business meeting was held, the President, Mr. W. H. Phillips, in the chair, after which the 6.45 train was caught, and the party arrived in Belfast soon after eight o'clock. The ornithologists reported that thirty-eight species of birds were observed during the day. The most interesting observation made by them was that of a male Wigeon (*Mareca penelope*) on the lake in Dungannon park. It would be interesting to discover if this bird were breeding here, as the species usually migrates northwards at a much earlier date, and so far no authenticated instance of its breeding in Ireland has been recorded. Owing to the excessively dry, hot weather, even the commonest species of land and freshwater mollusca were absent in many typical habitats, and the day's collecting, on what would have been considered good ground under the conditions, resulted in only sixteen species being collected, where over thirty might have been expected. The

entomologists reported the Red Admiral and Orange-tip butterflies, while one member obtained a small but perfect wasp's nest. The botanists were also very busy, being stimulated by the offer of a book prize by the President for the best collection of wild flowers. This was won by Miss Ella Boyd, of the Dungannon Club, whose vasculum contained eighty species of plants. The best find of the day was *Ranunculus trichophyllus*, which has only been recorded from County Tyrone on one previous occasion.

MAY 27.—The Geological Section held an excursion to Cave Hill and Carr's Glen. The party proceeded from Castle Junction by tram to the foot of Cavehill Road, at which point they were met by a further detachment of members and friends.

On reaching the Cave Hill quarries Mr. Gray drew particular attention to the missing Oolitic formations which should occur between the Rhætic (Lower Jurassic) and the Greensand (Upper Cretaceous) formations, representing a gap of about 5,000 feet. This feature shows that at a period between Lower Jurassic and Upper Cretaceous times the region had been elevated above sea level, with the result that great masses of the strata had been stripped from the land.

A few of the members proceeded to Carr's Glen to work at the Lias, but several returned to town, as after the heavy rains the glen was not in good order for geologising. The find of fossils was not large, the specimens recorded being *Exogyra conica* var. *lævigata*, *Belemnites ultimus*, *Belemnitella mucronata*, *Echinocorys vulgaris*, *Rhychonella limbata*, spines of *Cidaris*, and *Cardinia ovalis*.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 20—EXCURSION TO KILLAKEE DEMESNE.—Members and visitors, to the number of twenty, assembled at Terenure at 2 p.m. From here cars took the party to Rockbrook Post Office. The party then entered the demesne of Killakee, where, under the conductorship of D. Houston F.L.S., some hours of steady botanizing took place. The party returned to Rockbrook at 5.30 p.m. for tea.

JUNE 3—EXCURSION TO TWO ROCK MOUNTAIN.—The party, twenty-four in number, started by car from Terenure at 2 p.m. for Harold's Grange. From here an ascent of the Two Rock Mountain took place under the conductorship of F. O'B. Ellison, B.A. (Hon. Sec.). The special object of the excursion was the study of plant associations, as displayed by the flora of the Two Rock Mountain. The party returned at 6 o'clock to Dundrum, where they were hospitably entertained by Miss Bernard, of Elm Lawn, a member of the Club. Messrs. Eckersley, Lyons, and Murray were elected members of the Club.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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A FURTHER GLYCERIA HUNT.

BY R. LLOYD PRAEGER.

IT may be remembered by my botanical readers that last year, in describing a search for *Glyceria festucaeformis* round the shores of Strangford Lough, it was found that wherever cattle had access to the shores (and this was almost everywhere), there was no use in searching for the grass ; and that a small ungrazed islet to which I swam was found to be literally in possession of the plant in question. Acting on this hint, I devoted two July days this year to an exploration of the islands of the lough. I had the advantage of the company of Mr. H. C. Marshall, himself a local man and a keen botanist, and (through him) of two excellent boatmen from Ardmillan, whose exact knowledge of the myriad channels and reefs of Strangford Lough continually filled us with admiration. According to local statement, there are 365 islands in the lough, one for every day in the year—a peculiarity belonging to several Irish localities ; but of these, almost all are grazed, the animals being brought by boats or by swimming as the case may be. The conditions imposed by experience—namely, reefs rising above spring tide level, and not invaded by cattle—imposed a strict limitation on the number of islets to be examined.

Slipping down the channel from Ardmillan, we first, after a preliminary unsuccessful cast on the mainland shore, explored the Lythe Rock. Here, over two miles north of its most northerly mainland station (Ringhaddy) we found the plant growing in great abundance and luxuriance. We tried, as a kind of control experiment, the rough shore of Mahee Island close by, but here cattle have played their usual part and no trace of the grass was to be seen. Then we went south a couple of miles to Craigaveagh, the next spot fulfilling the required conditions. Here, again, *G. festucaeformis* formed one of the leading features of the vegetation, especially on the southern shore. Green Island Rock, lying west of the Minnis Islands, was our next point. It proved to be in complete possession of the grass—indeed, the only other plants present

were *Atriplex*, *Suaeda*, *Lepigonum medium*, and *Aster*, all in comparatively small quantity. Terns were here in numbers, with a nest every yard along the circular fringe of seaweed that marked storm-level. After a halt for lunch at Ringhaddy, we went on to the "Gull Rock of Dunsy," off the east shore of Dunsy Island, whose fauna consisted of a cloud of Terns and ten baby Mergansers, and the flora of a forest of *G. festucaformis*. Thence to Dunsy Rock, where our grass grew in a broad band thirty feet wide, looking like a waving field of corn two feet in height. From Dunsy we directed our course to Black Rock, off Ringdufferin, recognizable afar by the cloud of Terns hovering over it. Here *G. festucaformis* was in still greater profusion, and particularly fine. The normal succession of maritime plants, which we had already observed on other islets, was here conspicuously displayed. First the zone of *G. festucaformis*. Above that the maritime *Atriplices*, and above that again *Agropyron repens*. From Black Rock we went to Dunnyneill. Here there are two islets, more elevated than any we had visited. Our skipper, Hamilton Gilmore, predicted that the grass would not be here, and he proved to be correct. These Strangford islets, though their names frequently end in "Rock," are banks of tough red Boulder-clay. On the larger or higher islands, sufficient material is present to form by attrition a gravel-beach of some little depth. On this substratum *Glyceria festucaformis* does not grow. What it likes is an inch or two of stones resting on the drift. This it gets in many places on the mainland and the smaller islands. The islets which were in possession of this grass were all of the same character—low enough to be washed during winter storms, with a thin layer of gravel intermixed with boulders, lying on the Boulder-clay. Dunnyneill, with its gravelly shore and high interior, is thus unsuitable, and even the absence of cattle does not induce the plant to put in an appearance.

Next morning we left Killyleagh early. It was dead calm, with a thick mist on the water; there was not a sound save the occasional splash of a fishing Tern, and we crept silently up the Quoile to Swan Rock, alias Rat Island, lying north of Gore's Island, and near the islet on which I found such quantity of *G. festucaformis* last year. Like the latter island,

Swan Rock yielded the plant in the greatest abundance. Here, again, the succession of zones of maritime plants was extremely well marked. In ascending order, first came a grand fringe of *G. festucaformis*, then *Atriplex* plus *Aster*, then *Agropyron*, then *Festuca ovina*, and finally a little plateau of meadow plants, such as *Leontodon autumnalis*, *Cnicus lanceolatus*, &c., growing above the highest storm level.

We had next a long row to Bird Island, lying in the middle of the lough opposite Kircubbin. This islet, like Dunnyneill, is higher than most, with a more gravelly beach, and in consequence the *G. festucaformis* zone is missing, save at the south-eastern side, where the Boulder-clay comes to the surface. A couple of miles of sailing northward, now with a fair breeze, brought us to Sheelah's Island. This is a low gravel ridge, yielding only *Atriplex*, *Silene*, *Cochlearia*, and *Festuca ovina*—not to mention a vast quantity of Terns. Our last call was at Gabbock Island off Greyabbey, where we were pleased to see a fine fringe of the grass along the western shore; on the eastern shore the plant was rarer. It was now low water, which made these upper islands of the lough difficult of approach, and prevented access to the last of the likely spots, a rock called Chanderies, off Mountstewart. Our skipper, who had already proved correct in predicting the botanical capacities of almost every island we visited, assured us that the grass was abundant there, and promised to procure and post us specimens.

With a brisk southerly breeze, we slid across the lough, and again landed at Ardmillan. The result of our cruise was to show that on every island in Strangford Lough where suitable natural conditions prevail, and where cattle have not destroyed the taller vegetation, *Glyceria festucaformis* is the most abundant maritime species, forming a broad dense fringe rather lower down than the fringes of *Atriplex*, *Agropyron*, and *Festuca ovina* by which it is usually accompanied.

NOTES ON SOME HEPATICS OF ULSTER.

BY REV. CANON H. W. LETT, M.A., M.R.I.A.

IN the supplement to the Flora of the North-east of Ireland, reprinted from the Proceedings of the Belfast Naturalists' Field Club for 1894-95, at p. 235, at the end of the Cryptogams there occurs this paragraph :—"ERRONEOUS OR DOUBTFUL HEPATICS--The following Hepatics quoted from the Templeton MSS. have been deemed too doubtful for insertion in the foregoing list. While the greater part are certainly errors, it is probable that some may yet be verified, and with this view they are now made public.

*Porella thuja.**Cephalozia curvifolia.**C. byssacea,**Harpanthus scutatus.**Plagiochila tridenticulata.**Mylia anomala.**Jungermania cuneifolia.**Jungermania pumila.**J. barbata.**J. exsecta.**J. excisa.**J. incisa.**Nardia compressa."*

In the foregoing list Templeton's nomenclature, which was that current in his time, has been replaced by names now adopted. In this quotation Templeton's localities, which are given for the species, have been omitted, as they are referred to further on in this paper.

It is pleasant to be able to write and show that since the above "black-list" was printed, almost the very thing that the editor expected has occurred. Several of Templeton's records which were doubted have been verified by the rediscovery of the plants in Antrim and Down ; concerning which the following notes are offered :—

Madotheca thuja (Dicks.)—Mr. Templeton, who knew this Hepatic as *Jung. thuja*, made two beautiful and characteristic coloured drawings of it, to which are these remarks, which I quote in full to shew that he made no mistake in identifying this plant :—"Pinnate, with the branches (most unbranched), gradually narrowing towards the apex, leaves round imbricated, having underneath a triple series of stipules. Reticulations of the leaves a series of circles, in all others they are hexagons. Found on the rocks at the Waterfall of the river crossing the road, about a mile on the Belfast side of Carrickfergus, the fall is about two miles up the river, discovered March 31st, 1807." The locality, so very precisely

indicated, is of course Woodburn Glen, and there on the occasion of a visit by the Belfast Naturalists' Field Club in 1885, I found a patch of is plant. I found it also on Cave Hill, on rocks east of the first cave, 1st June, 1901.

Plagiochila tridenticulata, Tayl.—On this Templeton's remarks are:—" *Jungermania spinulosa*, var. *tridenticulata*, with a surculus scarcely an inch high, and a few small leaves with tridentate apices, Brit. Jung., var. 13. Common on the rocks of the Cave Hill, near Belfast." He gives a coloured drawing of what he names "*Jung. decipiens*," but which is undoubtedly the above Cave Hill plant. This I have myself gathered on several occasions on the rocks north-east of the first cave. And to this drawing of his "*decipiens*," Templeton has this note:—"Without the rigidity is supposed sufficient, I can scarcely reckon this, and var. *tridenticulata* of the foregoing distinct." Templeton's *tridenticulata* is a larger plant than Taylor's and Carrington's, from the Co. Kerry, which still abounds at the Torc Waterfall and on Brandon Mountain. Templeton was uncertain as to *A. decipiens* and his *tridenticulata* being inseparable.

Mesophylla "[*Mylla*] **compressa** (Hook.), near Belfast."—Occurs in abundance in many of the streamlets amongst the Mourne Mountains, where Mr. Waddell and I have often gathered it. It does not appear to have been found by recent botanists in the county of Antrim.

Cephalozia curvifolia (Dicks.)—Templeton's locality is:—"Found in the crannies of rocks at Binian [Slieve Bingian], Mourne Mountains." I met with it on the sheep tracks amongst the heather, about half way up the slope on the north side of the Hen Mountain, near Hilltown, 1898.

Cephalozia divaricata, Sm.—Templeton knew this plant as *Jung. byssacea*, the name under which it is figured in Hooker's *Jungermaniæ*. Mr. Stewart seems to have been doubtfully of this opinion, when at p. 232 of the *Flora* of the N.E. of I. he wrote of *C. divaricata*, which Mr. Waddell and I found in the Mourne Mountains, &c.:—"This was probably the plant noted by Templeton as *C. byssacea*, occurring at Lambeg, &c.", and yet in the next page he placed it in the list of "Erroneous, &c." Moore, in his *Irish Hepaticæ*, enumerated *byssacea* as distinct from *divaricata*, while acknowledging that he was "by no means clear about the characters which distinguish" them. Husnot in *Hep. Gall.* makes *byssacea* a var. of *divaricata*, and "more common than the typical plant."

Jungermania incisa, Schrad., "found in Lambeg Bog" by Templeton. The specimens of this plant which I have from the north-east district are from Rasharkin Bog, 1889; and Ballygowan Bog, and a small bog one mile west of Saintfield, Co. Down, 1898, Lett and Waddell; it was plentiful in both localities, creeping over decaying *Sphagnum* and other mosses in very wet spots.

Aplozia pumila (With.).—Templeton records "*Jung. pumila* common on bare ground about Belfast," and he gives two drawings in which two

species are represented. It is to be noted that the habitat which he gives opens a question as to whether he meant *pumila* or *Alicularia scalaris*. The home of the former is "on rocks close to water;" while a favourite habitat for the latter is on bare ground at the edge of paths and roads, and in such places, according to my experience, in Ulster, Connaught, and Munster it abounds. My record of *pumila* is from Co. Down, Moygannon Glen, near Warrenpoint, 1900, Lett and Waddell.

Jungermania bicrenata, Schmid. (*Jung. excisa*, Sm. Eng. Bot., t. 2497).—Templeton's records of "*excisa*" are, "growing on Divis Mountain, the Black Mountain, Co. Antrim; Holywood Warren, Co. Down; among *Dicranum heteromalla* in the Co. Derry." It was demonstrated many years since in the "Transactions" of the Botanical Society of Edinburgh, by Mr. Spruce and Dr. Carrington, that "we have no such British species as *Jung. excisa*." But Templeton collected the plant that is figured and described in Smith's E. Botany under the name *excisa*. Of this plant, which was the *excisa* of English botanists of his time, Templeton gives a drawing, which is a good representation of what is now known as *Jung. bicrenata*, Schmid.

The figures in Smith and in J. Dickson's Plant Crypt. Bot., Fasc. 3, p. 11, t. viii., f. 7, to both which Templeton refers as his authorities, are undoubtedly not *excisa* as at present known to European botanists, but, according to my judgment, *Jung. bicrenata*. And what strengthens me in this view is, that I have in my herbarium a specimen collected by W. Wilson, and labelled in his handwriting "*J. excisa* from Delamere Forest, Cheshire, 1830," which is *J. bicrenata*. I am aware that Mr. Pearson considers the *excisa* of Smith and Dickson to be the same as *capitata*; my reason for differing from this authority is that I have also in my herbarium two specimens of *J. capitata*, Hook., collected and labelled by W. Wilson in 1831, which are that plant, and not what he named in the other specimen as *excisa*.

J. bicrenata does not appear to have been often found in Ireland. I myself have never met with it but at one place, "Co. Down, on roadside between Scarva and Banbridge, on the vertical face of a rock (1900);" it has probably been overlooked owing to its habit of getting coated with dust to such an extent that all the leaves are concealed, and nothing appears but the abundant capsules, which might easily be passed over for the seeds of some phanerogam shed on the earth.

Jungermania barbata, Schreb.—There is a drawing by Mr. Templeton (MSS.) of this plant made from a specimen gathered in the Ness Glen, Co. Derry, June 20, 1809. It is a beautiful portrait, and about it there can be no doubt. He also gives a similarly correct drawing of what is now known as *Jung. lyoni*, Tayl., but which he and succeeding botanists named *Jung. quinquedentata*, and his specimen was "found at Divis, March 26, 1813." But while the illustrations are correctly named, a note about *J. barbata* by Templeton is not free from the confusion that for long hung about this plant and *J. lyoni*. This is the note—" *J. barbata* common in the perfectly procumbent state on the

rocks about the Cave Hill, near Belfast, fig. 1. With the ascending shoots and tridentate leaves, found in the Ness Glen, Co. Derry, June 20, 1809, fig. 2. With the ascending shoots and quadridentate and quinquedentate leaves found at Divis Mountain, near Belfast, March 26, 1813." The drawings, though not marked "fig. 1 and fig. 2," are unmistakable, as on each is named the locality where the specimen represented was collected. However, Templeton's note is hazy. But *J. lyoni*, Tayl., is still common on the rocks at the Cave Hill; I have on several occasions found it there. *J. barbata* is still wanted from Antrim and Down.

Thus eight of the "errors and doubtfuls" of Templeton are removed, and there remain yet to be rediscovered these five:—

Clasmatocolea cuneifolia (Hook.).

Jungermania exsecta, Schmid.

Harpanthus scutatus (Web. et Moshr.).

Coleochila anomala (Hook.).

Jungermania barbata, Schreb.

It is to be hoped that the botanical members of the Belfast Field Club will seek and find them.

I have collected during the past few years some other Hepatics that are rare or have been overlooked in Ulster, and several of these are very interesting, being new to the Province. I also add below some new county records.

Riccia sorocarpa, Bishoff.—Londonderry, Magilligan, May, 1904, Lett and Waddell.—In flat, wet meadow-ground near the middle of the sand dunes; the locality is covered with water in the winter season. The only other Irish locality that I know of is near Dingle, the same where Moore and Lindberg collected it.

Targlona hypophylla, L.—Templeton's record of this plant is—"On the rocks of the Cave Hill, on the north side of the first cave, Nov. 6, 1809." Local botanists often searched for this plant, but in vain, till the 21st June, 1902, when I rediscovered it. Moore found it "on warm basaltic rocks at the Little Deer Park, Glenarm, Co. Antrim, 1834. Very rare." It is worth mentioning that this locality is not in the present park of the Earl of Antrim which surrounds his stately residence, Glenarm Castle. The Little Deer Park lies to the south-east of Glenarm town, between the cliffs and the sea, and is now traversed by the coast road from Larne to Glenarm. Before this road was engineered it was an ideal natural enclosure for deer, they being shut in between the cliffs and the sea.

Codonla ralfsii (Wils.).—Co. Londonderry, Magilligan, May, 1904, Lett and Waddell. In damp hollows amongst the sand dunes. This is an addition to the Ulster flora. The plants were in fruit, growing just at the margin of the dwarf herbage, and the fronds being in great part worn away nothing was visible on the sand except the little capsule, like a cabbage seed, of a dark green colour.

Fossombronla cristata, Ldbg.—This was growing abundantly on the shore of Lough Briclan, close to my residence, where I discovered it in October, 1890 (Pearson, Hep. Brit. Isles, p. 420), but though I have kept a look out every year since, I have not been able to find even one plant. It grew on a whitish deposit of clay left exposed by the falling water in the summer, which would not have been accessible that autumn had it not been a very dry one.

Colura calyptrifolia (Hook).—Co. Down, Mourne Mountains, Slieve Donard, 1899, Lett. This also I have added to the Ulster flora. It grows on the perpendicular face of the rocks in the chasm into which the streamlet falls at the Black Stairs, associated with *Lejeunia hamatifolia*, *Lejeunia ovata*, and *Frullania fragillifolia*.

Lejeunia flava (Sw.).—The plant so named from Co. Donegal, contributed two years ago to the Moss Exchange Club, was *L. serpyllifolia* v. *heterophylla*, Carr.; *L. flava* has not hitherto been found anywhere in Ireland outside of Co. Kerry.

Madotheca lævigata (Schräd.).—Co. Antrim, Drumnasole, 1890, Rev. S. A. Brenan; Co. Tyrone, Benburb, rocks below the castle, 1880, Lett. Glenarm Park, 1895, Lett and Waddell. This plant is not mentioned in the Flora of the North-east of Ireland (1888), nor in the Supplement to same (1895). The above appear to be the only records of it from Ulster.

Diplophyllum obtusifolium (Hook.).—Co. Armagh, Camlough Mountain, Carrifkeeny, at 800 ft., August, 1904, Lett. Another addition to the flora of Ulster. In hollows on the shady, vertical face of an earthen fence. Growing along with *Dip. albicans*, *Webera sessilis*, *Dicranella heteromalla*, and *Scapania compacta*.

Diplophyllum dicksoni (Hook.).—Co. Down, Mourne Mountains, Shanlieve, at 1,500 ft., 1898, Lett. Co. Louth, Carlingford Mountain, at 1,400 ft., 1900, Lett and Waddell. Co. Donegal, Slieve League, 1902, Lett; (*J. Bot.*, Nov., 1903). I am not aware of any other notices of this rare plant having been collected in Ulster.

Scapania calcicola (Arn. et Pers.).—Co. Derry, Magilligan, 1900, Lett and Waddell. On heathy mossy patches at the edge of damp spots amongst the sand dunes. The fine sand of this place contains a large proportion of sea-shell dust, which accounts for the presence of this and the moss *Entodon orthocarpus*, Ldbg., both plants being calcicolous. This is an addition to the flora of Ireland. There is an interesting account of it by Prof. Douin, of Chartres, in the Revue Bryologique for May, 1905.

Scapania curta (Mart.).—Co. Derry, Magilligan, 1900, Lett and Waddell, in damp mossy places amongst the sand dunes near the foregoing species. It was also found in the ravine on Benevenagh Mountain. Co. Donegal, Slieve League, 1902, Lett, (*J. Bot.*, Nov., 1903).

Scapania compacta (Roth.).—Co. Down, Scrabo Hill, 1903, Lett and Waddell; in several places on the rocks on the top of the hill near the Londonderry Tower; Co. Armagh, 1890, Lett, at Carrifkeeny on the north of Camlough Mountain, (M'Ardle's List of Irish Hepaticæ.)

Scapania irrigua, Nees.—Co. Down, in bogs near Saintfield, 1899, Lett and Waddell. Near Loughbrickland in the Brown bog, 1901, Lett. In both gatherings the plants have perianths in abundance.

Scapania rosacea (Corda.)—Co. Donegal, Slieve League, 1902, Lett; (*J. Bot.*, Nov., 1903). This was the first record of this little gem of a plant from an Irish locality, and it does not appear to have been found since; it is not mentioned in M'Ardle's List (1904). From Prof. Douin, of Chartres, to whom I sent a portion of this gathering, and who has made a special study of the genus *Scapania*, I have received this note:—"This I consider to be true *Scap. rosacea* (Corda), from its perianth, the direction of the leaves which do not cross the stem, and from the rounded shape of the leaf-cells. C. Müller, of Fribourg, considers *Scap. rosacea* to be of a certainty a very good species."

Scapania speciosa (Nees.) Lett.—Co. Down, Slieve Donard, at the Black-stairs, 1887, Lett; Co. Louth, Carlingford Mountain, the Golden river, 1889, Lett; Co. Armagh, Camlough Mountain, 1900, Lett; Co. Donegal, Slieve League, 1902, Lett (*J. Bot.*, Nov., 1904.) All the specimens from these localities are very fine examples of this the largest and most beautifully coloured of the British Scapanias. They have been submitted to Prof. Douin, who agrees with me about them.

Scapania laxifolia (Dmrt.) Lett.—Co. Down, Mourne Mountains, Shanlieve, 1898, Lett. David Moore (*Proc. R.I.A.*, 1876) recorded this hepatic from Co. Donegal, while he considered it identical with *resupinata*. He says:—"On Muckish Mountain, Co. Donegal, I have seen it tall and straggling among the heath in loose stems quite unlike the fawn-coloured patches on the west coast, yet easily recognizable as the same plant." I have examined Moore's specimen from Donegal, in the Herbarium of the Science and Art Museum, Dublin, and it is precisely the plant which I have gathered in Ulster, Kerry, and Mayo.

Scapania nemorosa, Dmrt.—Co. Down, Rostrevor, 1899, Lett. Abundant on the rocks—the tufts being filled with sand—along the south bank of the river just above the bridge at Rostrevor. I refer to this record as Templeton in his record of the plant says—"Found in my journey to Mourne Mountains in August, 1803, in Rostrevor Glen." No doubt the same spot in both cases.

Marsupella funckii (Nees.)—Co. Down, Mourne Mountains, Kinahalla, 1902, Lett. A small patch was found by the side of a path at east of Kinahalla Wood. Co. Armagh, Camlough Mountain, 1902, Lett (M'Ardle's List of Hepaticæ). Abundant and in fine fruit at the edge of an old road that passes over the mountain between Newry and Killeavy, just at the gap called Barnish. And also (1904) in abundance at Carriffkeeney on the north-east face of this mountain, where a long lane ends above the cultivated ground; some of these patches were a foot wide and *funckii* was unmixed in them with any other species, in other patches there was a mixture with *Alicularia scalaris*. Moore's record (1837) and the above seem to be all that is known of this plant for the nine counties of Ulster.

Marsupella emarginata (Ehrh.) v. **minor**.—Co. Armagh, 1898, Lett. I found at the same place (Barnish) as the foregoing, a variety of *emarginata*, which seems to be the plant collected by Dr. Carrington at Cromagloun in the Killarney district [*Trans. Bot. Soc. Edinb.*, 1863]. In a paper entitled "Gleanings among the Irish Cryptogams," Carrington says "There is a small neat variety growing on wet boulders, Cromaglan, almost intermediate between this and *funckii*." The plants in Co. Armagh grow in unmixed patches at the opposite side of the old road from *funckii*. The stem is 6-12 mm. high, seldom branched, the leaves increase in size upwards to apex, where they surround the very large bracts. It is a larger plant than *funckii* and grew on shady but not wet rocks. Since I wrote the foregoing, I have been in the wood on Rostrevor Mountain, Co. Down—(27th June, 1905) and found this var. *minor* in several places on rocks.

Gymnocolea inflata (Huds.)—Co. Antrim, Derryaghy, on sandstone rocks, 1905, Waddell; Co. Armagh, Barnish, between Newry and Killeavy, 1904, Lett; Co. Down, between Banbridge and Scarva, near Ballyvarley School, 1904, Lett.

This species is not given by Stewart in the Flora of the North-east of Ireland (1888), nor in the Supplement to the same (1895). It was known however to Templeton, who writes—"Found on the rocks of the high rocky bank above the Many Burn Bridge at Purdysburn Race Course. On the ground at Ballynafoy Moor. In a little glen on the shore side about half way between Holywood and Bangor." (Templeton MSS.)

Jungermania riparia, Tayl.—This does not seem to be a common hepatic, though it is not scarce where it does occur. The following additional Co. Down localities may be added to the list. Moygannon Glen, 1900; and rocks in river Bann above Hilltown, 1900; Lett and Waddell.

Jungermania bantriensis, Hook.—Co. Antrim, Colin Glen, 1898, Waddell. Co. Down, Moygannon Glen, 1900, Lett and Waddell; a remarkably fine and fertile tuft.

Jungermania capitata, Hook.—Co. Armagh, Camlough Mountain. Carrifkeeny, 1904, Lett. The specimens that were found were furnished with mature perianths.

Jungermania minuta, Crantz.—Co. Down, Slieve Donard, in the White River Glen, 1899, Lett. A few plants, mixed with *Marsupella emarginata* and *Kantia sprengelii*. This seems to be an addition to the flora of Ulster.

Jungermania gracilis, Schleich.—Co. Armagh, Camlough Mountain, on the face towards Newry, at 900 ft., 1899, Lett. Growing on dry rocks in shady places, associated with a dark green form of *Scap. resupinata*.

Jungermania alpestris, Schleich.—Co. Down, Saintfield, about a mile west of the town on vertical rocks in a road cutting, 1898, Lett and Waddell. We also collected this on rocks near the top of Scrabo Hill, 1903.

Aplozia cordifolia, Hook.—Templeton (MSS.) found this plant in the Mourne Mountains. In Moore's album of mounted specimens of Co. Antrim mosses and hepatics, now kept in the Science and Art Museum herbarium, Dublin, there is a specimen of this plant, with the note—"Frequent in the northern glens, especially near waterfalls, always barren." And he records it in his Report on Irish Hepaticæ (1876) from the "river which flows to Cushendun, Co. Antrim, three quarters of a mile above the village, 1836." But it has not been since found in either county. It may be mentioned here that it was while searching for this plant in the Cushendun River that the Rev. S. A. Brennan discovered *Riccia glaucescens*.

Cephalozia catenulata (Hübner.)—Co. Down, Mourne Mountains, Hen Mountain, 1885, Lett.

Cephalozia fluitans, Nees.—Co. Antrim, Parkmore, 1887, Lett. Co. Down, Slieve Donard, the White River Glen, 1899, Lett.

Cephalozia lunulæfolia, Dmrt.—Co. Down, Mourne Mountains, Slievenamaddy, 1885. Co. Armagh, Parish of Montiagh, Derrycrow 1885, Lett.

Cephalozia pallida, Spruce.—This, which I collected in Co. Donegal, 1902 (*J. Bot.*, Nov., 1903), has not yet been found in any other part of Ulster.

Cephalozia lammersiana (Hübner.)—Co. Down, in a bog between Saintfield and Kilaney, 1898, Lett and Waddell.

Cephalozia starkii (Funck.)—Co. Armagh, Camlough Mountain, 1887, Lett and Waddell.

Cephalozia francisci (Hook.)—Templeton (MSS.) has the following interesting notice of the occurrence of this plant. "In a bog on the Co. Donegal Mountains, about half way between Letterkenny and Dunfanaghy, in company with Mr. Hooker and Dr. Taylor, July 11th, 1815. Found at High Town Hill (Carnmoney, Co. Antrim), near the Cave Hill, Aug. 28th, 1815."

Aghadery, Co. Down.

NEWS GLEANINGS.

The Dublin Museum.

We are very pleased to announce the appointment of Mr. A. R. Nichols as Assistant Keeper in the Natural History Section of our National Museum. Mr. Nichols has done excellent work in the collection for nearly a quarter of a century, and we congratulate him heartily on this recognition of his labours. Mr. J. N. Halbert now becomes First Assistant.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Chinese Jay Thrush from Lord Bellew, a Mona Monkey from Justice Smyly, a Purple-capped Lory from Mr. Yeames, a a Suricate from Mr. G. Armstrong, a Crested Grebe from Mr. O'Callaghan, a Parrot from Mrs. Bradley, and two Peacocks from Mr. Flood. Monkeys and Parrots have now taken possession of the transformed out-door aviary.

DUBLIN NATURALISTS' FIELD CLUB.

JUNE 24. — EXCURSION TO MOORHILL, BRANNOXTOWN. — A large number of members and visitors left Kingsbridge by the 8.20 train for Harristown. On arriving the party walked through Harristown demesne to Moorhill, which, by invitation of the owner, Mr. W. B. Brownrigg, M.A., was made the headquarters for the day. The members now entered on their various pursuits, the glacial drift being examined with great interest. It is represented in this district by a stiff boulder-clay charged with boulder, and fragments of Carboniferous limestone, quartz rock, and igneous rocks. A fragment of *Balanus* was discovered by J. de W. Hinch. The party, which was very hospitably entertained to lunch and afternoon tea by Mr. Brownrigg, returned to town by the 5.27 train after a most enjoyable outing. Miss Wilson was elected a member of the Club.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 10. — The second excursion of the season took place, when one hundred and twenty members and friends left by the quarter-past two train to Ballycarry *en route* for the Gobbins.

Arriving at Ballycarry, the party divided—half driving to the “path,” and the rest walking the whole distance along the undercliffs to the basaltic bastions of the coast. Much indignation was felt when it was discovered that the Sea Spleenwort (*Asplenium marinum*), which Mr. Berkeley Wise had taken so much pains to protect, had almost entirely disappeared.

At six o'clock tea was provided at Hill's cottage, after which a short business meeting was held, and some new members elected; then the return journey commenced.

NOTES.

ZOOLOGY.

Irish Zoophytes and Sea Anemones.

A paper, valuable to students of our marine fauna, has been published by Miss Jane Stephens in the *Proc. R. Irish Acad.*, vol. xxv., section B., No. 3; this is "A List of Irish Coelenterata, including the Ctenophora." The Irish marine area is defined and divided into regions, as in Mr. Nichols' faunistic papers, and the distribution of each species is recorded with great care and accuracy, with references to an exhaustive bibliography. An index in genera and species makes the list easy in use. Miss Stephens calls attention to the mingling of northern and southern forms of life off our western shores among the Coelenterates as among other groups of marine animals.

New Marine Crustacea.

In the British Association Report for 1904 (pp. 602-603) is a paper on "Some new Copepoda from the Atlantic Slopes," by G. P. Farren. During the dredging cruise of the "Helga" to the Porcupine Bank a number of new species of Copepods were obtained. These are briefly described here, but a fuller account is promised for the forthcoming Report of the Department of Agriculture and Technical Instruction for Ireland.

In the same Report (pp. 601-2) Mr. W. M. Tattersall contributes a paper on "Some new and rare Isopoda taken in the British Area." The species dealt with were captured during two cruises of the "Helga" off the west coast of Ireland and in Ballinakill Harbour, Co. Galway. Eight species new to science were found, four of them belonging to new genera, while two have been made types of new families. Full descriptions, with figures, of these Isopoda will appear in the Reports of the Department of Agriculture and Technical Instruction for Ireland.

Melitæa aurinia in Co. Kildare.

On June 12th, at Leixlip, I saw several "Greasy Fritillaries," and secured a specimen.

FRANCIS NEALE.

Dublin.

Notes on *Thecla rubi*.

I am greatly pleased to be able to add to the list of butterflies found here the Green Hairstreak (*Thecla rubi*). Among British butterflies I have seen no more beautiful example of mimetic disguise. It is in all respects a true "leaf-insect," not only in colour, size, and form, but in

its correlated instincts. This would hardly be recognised in a mounted cabinet specimen. It must be seen in its peculiar position of rest on the foliage of the Birch, the wings close pressed together, inclining downwards and to one side, and the brown marginal dots exactly producing the effect of the dentate edge of the leaf. It allows itself to be closely inspected; but it is all alive. An incautious movement, and it flutters away, and vanishes like a ghost.

W. E. HART.

Kilderry, Co. Donegal.

Vespa austriaca in Co. Wexford.

On June 15th I found running up a window-pane at Ballyhyland a light yellow wasp, which on being caught proved to be a female *Vespa austriaca*. As far as I know, this is the first recorded occurrence of *austriaca* in Co. Wexford, the counties already credited with that species or form in the *Irish Naturalist* being Wicklow, Carlow, Dublin, Down, Derry, Donegal, and Kerry. On the following day, June 16th, I took a second example as it was flying about a hedge-bank. These were the only two wasps I caught during the few days that I was in the country, and it is curious that they should both have belonged to the rare form which I have looked for vainly in previous summers. Of course, before catching them I could tell from their pale colour that they were either *rufa* or *austriaca*, but in former years I have caught numbers of similar light-coloured wasps in the hope of meeting *austriaca*, and have invariably obtained only *rufa*. Probably, therefore, 1905 is an *austriaca* year.

C. B. MOFFAT.

Ballyhyland, Co. Wexford.

Turnstones in the nesting season.

In the July number Mr. E. L. M'Clintock seems to be surprised at seeing Turnstones so late in the year as May. I believe odd birds are not uncommon on some parts of the west coast during the summer months. Two years ago on the Rockabill, off the coast of Dublin, in June I saw a flock of nineteen. They were very tame and allowed me to approach them close enough to see that they were in full breeding plumage. To find birds in breeding season has been long known to be no criterion that they are nesting in the district.

J. TRUMBULL.

Malahide.

[It was the fact of finding Turnstones on an inland freshwater lake that was deemed noteworthy.—EDS.]

Quail in Co. Kildare.

On June 12th, between Celbridge and Leixlip, I heard a Quail, but could not see the bird as it was in a meadow still standing.

FRANCIS NEALE.

Dublin.

A light buff Skylark.

While walking along the banks of the River Dee in Co. Louth, between Drumcar and Dromin Junction, I saw a Skylark (*Alauda arvensis*) of a light buff colour, hovering with some ordinary coloured birds of the same species. Is not this a curious variation from the ordinary colour? I have seen stuffed a similar variation of the Common Snipe (*Gallinago caelestis*) that was shot by my uncle some forty years ago near Randals-town, Co. Antrim.

E. L. L. M'CLINTOCK.

Crumlin, Co. Antrim.

Irish Cetaceans.

In proceedings which have just been issued of the International Zoological Congress held at Berne last year, Prof. R. J. Anderson gives us some particulars on the rarer species of the Irish Whale tribe. He states (p. 703-711) that during the last few years *Balenoptera rostrata*, *Globiocephalus melas*, *Grampus griseus*, and *Mesoplodon Hectori*, were stranded on the west coast. The last species which has been obtained from the Aran Islands had already been described in the *Irish Naturalist* (June 1904). The *Grampus griseus* was cast up near Galway, while *Globiocephalus melas* seems to have been received from the north of Ireland. The paper is accompanied by four plates representing skulls of whales, but Prof. Anderson might have informed us where the originals are to be found. The term "Nat. Mus." in itself does not convey much to the reader of the Proceedings of an International Congress.

The Wild Cat in Ireland.

Mr. de Vismes Kane's remarks in the July number of *Irish Naturalist* on my notes on Wild Cats in the previous number, evidently shows that he has mistaken my meaning, and he even misquotes one paragraph.

I made no comments on the fish-eating habits of the cats mentioned by the old fisherman, but merely remarked that his story need not be taken seriously, and I am still of that opinion. The paragraph misquoted reads thus:—"For if wild cats are so numerous, as stated, on the banks of the Lackagh, in such a wild uninhabited district, where probably no trapper ever laid a trap, some remnants of the race must be yet in existence."

I will further remark, that if in the old fisherman's time wild cats were so numerous in the locality, how is it that no remnants of the race exist at the present time? While in Scotland, the wild cats with similar surroundings, still hold their own against all the attacks made on them by game preservers and keepers.

Their disappearance from the fisherman's district cannot be attributed to scarcity of food, for both small mammals and birds are as numerous as ever; nor can it be ascribed to what caused the extermi-

nation of the Red Deer, for we have no evidence that the natives ever hunted the wild cat for food. No doubt there are many places in Ireland named after cats, but may not the places be named from being frequented by the Marten, in some districts known as the Marten Cat? According to the late F. J. Foot, in an article on the mammals of West Clare, in the Dublin Natural History Society's *Journal* for April, 1862, the Marten is known to the country people by "the name of Cat Kinse, or Cat of the Woods." If I do not mistake, it has been called in parts of Kerry the Hunting Cat.

ROBERT WARREN.

Moyview, Ballina.

[We do not think that any further discussion of this question is called for. Mr. Kane did not "misquote" Mr. Warren's argument; he summarized it fairly enough as it seems to us. Mr. Warren argues that if the story be true, Wild Cats should still survive in Co. Donegal, but they do not; therefore the story is unreliable. Mr. Kane agrees that they should survive, and thinks it possible that they may do so; therefore he brings forward his story as a support to Dr. Scharff's suggestion that the Irish Wild Cat still lingers on in remote districts. Let us hope that the production of a specimen will set the question at rest.—EDS.]

In my note on the discovery of the remains of a Wild Cat in the caves of Co. Clare in the April (p. 79) number of the *Irish Naturalist*, I expressed the hope that a few specimens of the species might still exist in some of the more inaccessible districts of the west. I cannot have expressed myself very clearly, for Mr. Warren has evidently misunderstood my note when he wrote his own in the June number with "Supposed Wild Cat in Ireland."

I wished to convey to the readers of the *Irish Naturalist* that I had compared the cat remains found in the caves with those of domestic cats with those of the European Wild Cat (*Felis catus*), and with those of the African Wild Cat, and that they agreed with those of the latter. Hence I concluded that the African Wild Cat existed formerly in Ireland. But the African Wild Cat resembles the European one very closely except that it has a pointed tail and not a bushy one. If, therefore, the African Wild Cat existed at the present moment in Ireland, it is extremely likely that it would be taken by competent naturalists like Mr. Warren for an escaped domestic cat. Even the great naturalists quoted by Mr. Warren have made mistakes in identification some time or other in their lives, and none of them probably dreamt of the possible existence in Ireland of a Wild Cat with a pointed tail. If they had been shown such a one, they would no doubt have put it down as an escaped domestic cat, and so would I have done until my special attention was directed to this subject by means of the cave researches which are being prosecuted with so much energy by Mr. Ussher.

R. F. SCHARFF.

Dublin.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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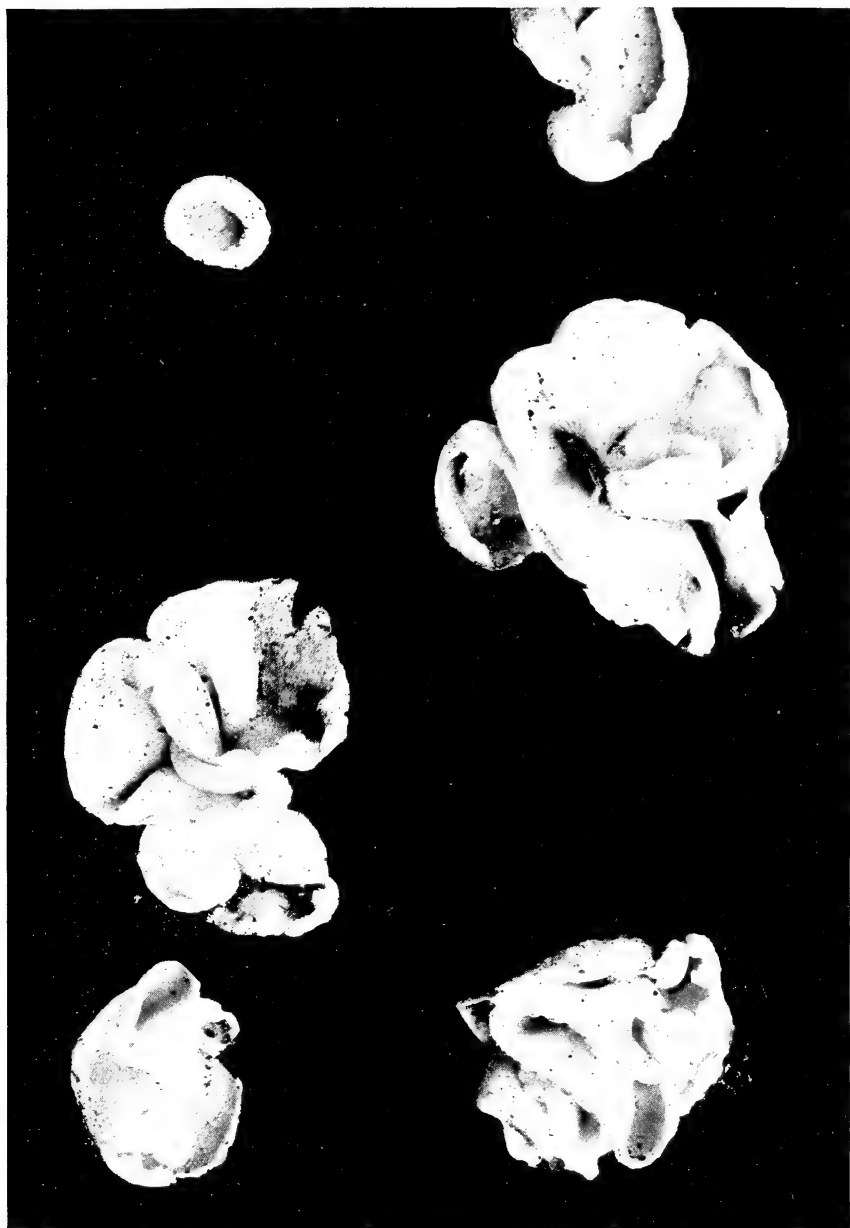
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PEZIZA ADAE.
(About natural size.)

OCCURRENCE OF THE FUNGUS *PEZIZA* ADAE IN IRELAND.

WITH A NOTE ON THE CONDITIONS ATTENDING ITS GROWTH.

BY JAMES STRACHAN.

[PLATE 5.]

TOWARDS the end of May, 1905, while collecting wild flowers in Ballyclare, Co. Antrim, Mr. Hugh Cairns drew my attention to a fungus growing in an outhouse on the surface of an old lime-heap. As it appeared to be rather an uncommon fungus, a specimen was forwarded to the Rev. Canon Lett, of Loughbrickland, through whose kindness it was identified at the Botanic Gardens, Kew, as the somewhat rare and interesting fungus *Peziza Adae*. This species of *Peziza* was so named after its discoverer, Miss Ada Balfour, of Edinburgh. This is the first recorded occurrence of *Peziza Adae* in Ireland.

Peziza Adae, Masee, "British Fungus Flora," vol. iv., p. 433.

References :—

Sadler, in *Trans. Bot. Soc. Edinb.*, 1857, p. 45, with figure.

Cooke, "Mycographia," page 349.

Phillips, "British Discomycetes," page 62.

Description :—

"Sessile, somewhat scattered, at first closed then expanding, usually irregular, margin entire or lobed, often reflexed, flesh quite thin, 1-2.5 cm. across; excipulum composed of septate, interwoven hyphae; externally pallid, the free portion almost or quite glabrous; basal portion giving off numerous septate, branched, thin-walled, colourless hyphae that fix the fungus to the matrix; disc white, or more or less deeply tinged rosy, lilac, or ochraceous; asci elongated, narrowly cylindrical, base tapering, 8-spored; spores obliquely 1-seriate, hyaline, continuous, usually 2-guttulate, elliptical, ends obtuse, smooth; paraphyses linear, slightly clavate, hyaline."

Habitat :—

"On damp, plastered walls. Distinguished among the larger species of *Peziza* by the very thin, delicate ascophore, also the small spores."

About a dozen groups of the fungus appeared, the largest of which measured 8.3 cm. across; the largest member of

this group measuring 6·3 c.m. across. This is more than twice the normal size of 2·5 cm. Excepting this extra large specimen, the average measurement of the full-grown specimens was 3 to 3·5 cm. The young fungi, from their first appearance, developed to maturity in a period of from 5 to 7 days; the large specimen mentioned above lived for nearly a fortnight, when it began to turn yellow and fade. The young fungi appeared in two distinct forms, firstly, quite open, flat, or disc-shaped, with a very regularly-lobed edge, and secondly, elongated or tall and cup-shaped, with the edge almost entire. The former invariably developed into a very regular and extremely pretty form, with reflex edges, lobed most regularly; the latter, on the other hand, without exception, developed into a more or less irregular folded form, with the edges sometimes entire, but usually lobed irregularly. This irregular form was much more common than the other, and figures well in the accompanying photograph (Plate 5). In colour, the specimens varied from white, tinged with a trace of violet pink, to a creamy colour.

As very little is known concerning the exact conditions attending the growth of fungi, this seemed to present a fit opportunity for making a few observations of the physical and chemical conditions under which this species of fungus seemed to thrive to a remarkable degree, producing a specimen of more than twice the normal maximum in diameter.

PHYSICAL CONDITIONS.—Being under cover, the interior of the outhouse in which the fungi appeared was not exposed directly to climatic extremes; nevertheless, there was abundant space of communication with the outside atmosphere through an open door and several openings in the brick wall. The roof was quite water-tight, and rain could only gain an entrance by soaking up through the floor. There were no side windows, but a glass roof-light allowed the interior to be fairly well lighted. The average temperature of the soil in which the fungi grew, during a week, was 16° C. (60·8° F.), while, during the same time, the average temperature of the soil outside in the open was 18·6° C. (65·5° F.).

CHEMICAL CONDITIONS.—The soil on the floor of the outhouse consisted of the remainder of an old lime-heap. This had not been disturbed for over two years, and in some places

the surface was covered with a dark-coloured substance, which proved to consist of mortar which had cracked and dropped from the walls, together with a little organic matter, probably dust, carried in by the wind. It was observed that the more irregular forms of the fungus grew on this dark-coloured earth, while the soil on which the more regular specimens developed was almost purely white in colour. This arrangement, however, may have been a mere chance. The following analyses give a good idea of the nature of the soils; No. 1 is the white, and No. 2 the dark-coloured soil—

	No. 1.	No. 2.
Moisture (at 100° C.),	30.1 per cent.	31.3 per cent.
Calcium hydrate (containing traces of Mg., Na., and K.),	13.7 „	10.1 „
Calcium carbonate,	55.2 „	40.6 „
Ferric oxide and alumina,6 „	.5 „
Organic matter,	Trace	5.0 „
Residue (chiefly sand),4 „	12.5 „
	<hr/> 100.	<hr/> 100.

An average sample of soil taken outside a few inches under the grass yielded 23.2 per cent. of moisture at 100°C. Some of the black organic matter in No. 2 appeared to consist of soot. The comparatively greater percentage of moisture in the soil from the outhouse over that taken from the normal earth is accounted for by the presence of an open water-drain which runs close to the wall and partly under the floor of the outhouse; the exhaust from a steam-pipe also drips against the side of the house.

In conclusion, the above considerations are submitted to the botanist in the hope that they may be of some slight value in that the above conditions represent very favourable circumstances for the growth of this particular species of fungus. By imitating the conditions artificially, I was successful in keeping a number growing for eight days in the laboratory.

Ballyclare, Co. Antrim.

NOTES ON THE BOTANY OF CENTRAL CLARE.

BY R. LLOYD PRAEGER.

THE County of Clare, with a flora surpassed in numbers only by a few of the rich eastern counties adjoining Dublin and Belfast, is to be looked on as one of the best worked, as well as one of the most interesting, areas in Ireland. Little of a novel nature could be expected as the result of field-work there, nevertheless some notes made during four days spent in the neighbourhood of Corofin last July may be found not devoid of interest. The great bulk of Clare records come from the north—the famous Burren area—which has attracted innumerable botanists, and from the south, along the Shannon, where S. A. Stewart and others have worked. The centre is thus left with comparatively little representation in our floras, though half a century ago F. J. Foot, Rev. T. O'Mahony, Dr. D. Moore, and more recently P. B. O'Kelly, H. C. Levinge, and Miss Knowles have raided the area in question. My rambles extended from Inchiquin Lough on the west to Crusheen on the east, with a north and south extension of less than ten miles. This is flattish limestone country, consisting of low ridges of bare grey rock, or of tilled land, with water-logged hollows occupied by mazy lakes or turloughs. To the north, the outposts of the grey hills of Burren rise gaunt and bare; westward the Coal Measures form low hill-ranges, which, in their softer outlines and grassy or rushy surfaces, contrast sharply with the limestone. On the east, again, the area is bounded by hills of Old Red Sandstone and Ordovician rocks, which further back, towards Lough Derg, rise to the dignity of mountains. The limestone basin drains southward into the estuary of the Fergus, and that erratic stream and its tributaries flit like wraiths through the district, appearing and disappearing, and springing underground from lake to lake. This latter fact is accountable for the wonderful clearness and purity of the water of these apparently stagnant lakes and marshes—a character that recalls what one reads of the Everglades of Florida. Peat occurs in the district only around a few of the lakelets; usually there is a flat marginal fringe of close grass and

sedges growing in white marl, and the same deposit, in times of drought like that of my visit, forms a dazzling broad margin of sticky mud round most of the lakes.

So much work has been done at the flora of Clare, that my notes may be much curtailed. The flora in general divides itself into three main groups :—(1) The calcicole group, inhabiting the limestone pavements ; (2) the hydrophile group, colonizing the marshes and lakes ; and (3) the agrarian group, affecting chiefly the fields and hedges of the tilled areas. As regards the first, I was interested in observing whether the remarkable flora of Burren descends into the lowlands on the south, as it does into the low country on the east, about Gort and Kinvarra. This I found to be the case. The limestones of the district at present under survey yields a full “Burren” flora, as the following list of plants, frequent or common thereon, will show :—

<i>Arabis hirsuta</i> , <i>f.</i>	<i>Galium boreale</i> , <i>f.</i>
<i>Arenaria verna</i> , <i>f.</i>	<i>sylvestre</i> , <i>c.</i>
<i>Geranium sanguineum</i> , <i>c.</i>	<i>Gentiana verna</i> , <i>c.</i>
<i>Rhamnus catharticus</i> , <i>c.</i>	<i>Euphrasia Salisburgensis</i> , <i>c.</i>
<i>Rubus cæsius</i> , <i>c.</i>	<i>Taxus baccata</i> , <i>f.</i>
<i>Saxifraga hypnoides</i> , <i>f.</i>	<i>Juniperus nana</i> , <i>f.</i>
<i>Rubia peregrina</i> , <i>f.</i>	<i>Sesleria cærulea</i> , <i>c.</i>
<i>Asperula cynanchica</i> , <i>c.</i>	<i>Ceterach officinarum</i> , <i>c.</i>

All of these run southward towards Ennis, and may be set down as characteristic of the central Clare limestones.

A few other Burren plants, though present, appear to be mainly confined to the hills, and in the low grounds occur more or less sporadically—*Dryas octopetala* and *Epipactis atro-rubens* are examples.

One or two of the limestone group, notably *Rhamnus Frangula*, *Spiræa Filipendula*, *Potentilla fruticosa*, and *Euphrasia Salisburgensis*, proved to be more widespread in this district than previous records would have led one to believe. *Plantago maritima* was abundant throughout, as over so much of the western limestone areas.

The flora of the lakes, streams, and marshes proved interesting. Where a fringe of reedy vegetation surrounds the deeper waters, it is often largely composed of *Cladium Mariscus*, *Juncus obtusiflorus*, and *Carex filiformis*, all of which are

common in this district. *Carex Hudsonii* (previously unrecorded from Clare), is also characteristic and abundant, accompanied by *C. vesicaria*. *Butomus umbellatus* is remarkably abundant and widespread, and other characteristic marginal plants are *Ranunculus Lingua*, *Ænanthe crocata* and *Æ. Phellandrium*, *Rumex Hydrolapathum*, and three *Nasturtiums* (*N. sylvestre*, *N. palustre*, and *N. amphibium*), the first-named sometimes in great profusion. Of hydrophytes proper, *Potamogeton lucens* is the most conspicuous plant, and in shallow water it is replaced by *P. heterophyllus* (unrecorded for Clare), and *P. plantagineus*. The pools yield great masses of Characeæ (*C. polyacantha*, *C. fragilis*, *C. hispida*), the first-named (new to Clare) being the most abundant. Where the bottom is peaty, *Lemna trisulca* and *Sparganium minimum* occur in quantity, with *Elodea canadensis*. In marshy meadows *Orchis incarnata* (unrecorded from Clare), is a frequent ingredient, with *Viola canina* occasionally.

The flora of the inhabited and cultivated areas comprises an unusually small proportion of the total flora, on account of the small percentage of arable land and thinness of the population. Trees and woods are rare. Ash dominates the patches of native wood, and Hazel is widely spread. *Hypericum dubium* was almost the only uncommon woodland plant noted ; it is of frequent occurrence. In damp pastures *Habenarias* (*H. conopsea*, *viridis*, *bifolia*, and *chloroleuca*), and in dry pastures *Orchis pyramidalis* are conspicuous. By roadsides, *Senecio biera didyma* and *S. coronopus*, *Veronica agrestis* and *V. polita*, *Origanum* and *Verbena*, are familiar sights, with *Convolvulus arvensis* occasionally. The most conspicuous weed of cultivated land is *Brassica alba* ; with it one notices *Centaurea Scabiosa*, and three Poppies (*P. Rhæas*, *P. dubium*, and *P. hybridum*).

It was with some surprise that I found that as many as 21 of the plants noted are additions to the well-worked Clare flora. These are :—

Thalictrum flavum.	‡Salix fragilis.
Ranunculus peltatus.	†purplea.
*Arenaria tenuifolia.	Orchis Morio.
Myriophyllum verticillatum.	incarnata.
spicatum.	Sparganium affine.
*Petroselinum sativum.	Lemna polyrhiza.
Betula verrucosa.	

Potamogeton heterophyllus.	Melica uniflora.
nitens.	Glyceria plicata.
prælongus.	Equisetum trachyodon.
Carex Hudsonii.	Chara polyacantha.

I have often looked with some despair on the devious mere spider line that, on even a large scale map, represents the botanist's field of observation on his passage over the country. There was, therefore, a certain satisfaction in discovering independently, and without forethought, already published stations for some of the rarest plants of the district. In this manner I stumbled on Mr. O'Kelly's original station for *Limosella*; also what is probably the same observer's station for *Teucrium Scordium*; and Rev. T. Warren's station for *Helianthemum vineale*, subsequently noted by Corry.

The notes below refer, in addition to the above plants new to Clare, mainly to species of which the Clare record rested hitherto on a single station, sometimes of some antiquity, as in the case of *Lepturus filiformis*, recorded from Aran by Mackay in 1806.

***Clematis Vitalba**, L.—Established on rocky banks of the Fergus below Riverstown bridge.

Thalictrum collinum, Wallr.—Lakelet a mile S.E. of Glasgeivnagh hill, and by Muckanagh L.

T. flavum, L.—Ballycar, Inchicronan L., Ballycullinan L., and east end of Dromore L.

Ranunculus circinnatus, Sibth.—L. Atedaun and Dromore L.

R. peltatus, Fr.—Stream out of Inchicronan L., and (*R. elongatus*, F. Schultz) in Inchiquin L.

R. pseudo-fluitans, Baker and Foggitt.—Frequent in streams.

Nasturtium sylvestre, R. Br.—Around Inchiquin L.; thence very abundant down the Fergus and around L. Atedaun. Plentiful also round Dromore L., especially on the southern shores. Much commoner in this district than *N. palustre*.

Helianthemum vineale, Pers.—Glanquin Mountain, which I take to be the name of the limestone hill (marked 629 feet on O.S. map), half a mile north of Coolreash L.—clearly the station described by Corry, and attributed by him to T. Warren.

Viola stagnina, Kit.—Skaghard L., growing in "turlough" ground, so baked by the sun that only with difficulty could the characteristic thread-like soboles be dug out.

***Arenaria tenuifolia**, L.—On railway near Crusheen.

A. leptoclados, Guss.—Roadside near Moyrhee schoolhouse.

Malva rotundifolia, L.—Ballyportry castle.

Geranium columbinum, L.—Roadside near Rinnamona L.

Rhamnus Frangula, L.—Widely spread in the Rockforest district, from Coolreash L. to Bunny L., and about Templebannagh L. and Muckanagh L.

Spiræa Filipendula, L.—Widely, but sparingly, distributed N. and N.E. of Rockforest.

Dryas octopetala, L.—Rare on the low grounds, but noted about Shandangan L. and Muckanagh L. Becomes abundant as soon as one ascends the limestone hills.

Potentilla fruticosa, L.—The abundance of this interesting plant in what may be called the Rockforest district was truly delightful. I first came across it forming a fringe round two lakelets a mile S.E. of Glasgeivnagh hill, a station recorded by Foot. Thence it extends eastward by Castle L., Skaghard L., Cooloorta L., and Rockforest L., to the eastern end of Bunny L. Another area occupied by the shrub extends from Templebannagh L. to the west end of Muckanagh L. Both Wade and Mackay have long since recorded it from the district, and subsequently Corry.

Drosera intermedia, Hayne.—Ballyogan L.

Myriophyllum verticillatum, L.—Pool north of Drummeeen castle.

M. spicatum, L.—Outlet stream from Inchicronan L.

Apium inundatum, Reichb. fil., var. **Moorei**, Syme.—By springs at the lakelet S.W. of Glanquin Mountain.

***Petroselinum sativum**, Hoffm.—Dromore castle.

Sium latifolium, L.—Around Dromore L.

Chærophyllum temulum, L.—Near Cooga House.

Valeriana Mikanii, Syme.—East shore of Inchicronan L.

Carduus crispus, L.—Near Ballyportry castle.

Myosotis repens, G. Don.—Hill over L. Raha. Not seen on the limestone.

***Linaria minor**, Desf.—Railway at Crusheen; also on the bare shore of L. Sillaun, far from roads or tillage.

Limosella aquatica, L.—Abundant and fine over an acre of ground at Mr. O Kelly's original station, at north end of Inchiquin L. Also sparingly by L. Sillaun.

Euphrasia Salisburgensis, Funk.—Abundant all over the limestone country down to Ennis. Also seen on the tops of large boulders of impure limestone on the east side of Inchicronan Lough, among calcifuge plants, such as *Athyrium* and *Digitalis*.

Utricularia intermedia, Hayne.—Ballyogan L., and lakelet S.W. of Glanquin mountain.

Mentha sativa, L.—Dromore L.

Teucrium Scordium, L.—On flat "turlough" ground, south of Castle L.

Euphorbia exigua, L.—Castle L., and on railway at Crusheen.

Betula verrucosa, Ehrh.—Marsh west of Ballyline House, and east shore of Inchicronan L.

‡**Salix fragilis**, L.—Dromore L.

†*S. purpurea*, L.—Inchiquin L.

Populus tremula, L.—Around the lakelets S.W. of Glanquin Mountain, and on rocks behind Rockforest.

Ceratophyllum demersum, L.—Pool near Drummeen Castle.

Hydrocharis Morsus-ranæ, L.—River south of Templebannagh L.

Epipactis atro-rubens, Schultz.—Shandangan L. and Glanquin Mountain. Seems very rare on the low-level limestones.

Orchis Morio, L.—Muckanagh L.

Typha angustifolia, L.—Near the north end of Inchiquin L., and in the R. Fergus below Riverstown bridge.

Sparganium affine, Schnizl.—In the Fergus above Inchiquin L., and river south of Templebannagh L.

Lemna polyrhiza, L.—Pool $1\frac{1}{2}$ miles S.W. of Corofin.

Potamogeton plantagineus, Duer.—Shandangan L., &c.; frequent.

P. heterophyllus, Schreb.—Frequent in the lakes.

P. nitens, Weber.—Ballyportry L., with floating leaves, which, Mr. Bennett remarks, are rare in the Irish plant.

P. prælongus, Wulf.—Coolarta L.

Eleocharis multicaulis, Sm.—Ballyogan L., Inchicronan L., and near Glanquin.

Scirpus pauciflorus, Lightf.—Bunny L.

Carex diolca, L.—Ballyogan L.

C. teretiuscula, Good.—Near Ballyline House, Ballyogan L., Inchicronan L.

C. extensa, Good.—Lehinch.

C. filiformis, L.—Ballyportry L., &c.; common.

C. Pseudo-cyperus, L.—Templebannagh L., Caheraphuca L., and abundant west of Ballyline House.

Phleum arenarium, L.—Lehinch sand dunes.

Melica uniflora, Retz.—Inchiquin L.

Glyceria plicata, Fr.—Near Corofin.

Festuca Myuros, L.—On limestone rocks near Castle L.

Lepturus filiformis, Trin.—Lehinch.

Lastrea Thelypteris, Presl.—West shore of Ballycullinan L., and N.W. shore of Inchicronan L.

Osmunda regalis, L.—Absent from the Upper Limestone district, but appearing at once on the Lower Limestone at Crusheen, and on the Coal Measures in the west.

Equisetum trachyodon, Braun.—Outlet stream from Inchicronan L.

E. variegatum, Schleich.—West shore of Ballycullinan L., and on rocks east of Rockforest L.

Chara polyacantha, Braun.—Abundant in lakes and pools.

A number of critical plants remain over, pending further examination. My thanks are due to Mr. Arthur Bennett and Rev. E. S. Marshall for giving their opinion on a few species.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Cherry-crowned Monkey from Major Pike, a Raccoon from Mrs. Scrivener, a pair of Stags, and a pair of Peregrine Falcons from Captain Arbuthnot, a Kestrel from Mrs. Gumbleton, and a Monitor from Dr. Langley.

Three Lion cubs have been born in the Gardens. One of the young Llamas lately born has been exported to Scotland.

BELFAST NATURALISTS' FIELD CLUB.

JULY 1.—The third excursion of the summer season took place to the Diamond Rocks and Tollymore Park when forty-four members met the conductors at the County Down Railway Station, where the 9.35 train was taken for Newcastle. On arrival here the party were driven to Trassey Bridge. Leaving the vehicles here the members divided, one half exploring Tollymore Park, and the other starting on the climb to the Diamond Rocks, led by Nevin H. Foster, and accompanied by two quarrymen. The granite of the Diamond Rocks shows well the "drusy" cavities where the essential minerals of the rocks have been able to crystallise without mutual interference, and, as a result, fine crystals of felspar, smoky quartz, and mica were obtained. Not uncommonly crystals of beryl and topaz are also to be got, but, with two exceptions, only small specimens of these were found. The exceptions were two very nice crystals of topaz.

The start for Trassey Bridge was made about 4 o'clock, and the whole party were driven back to Newcastle, where tea was provided at the Donard Hotel.

Afterwards a short business meeting was held. The senior Secretary, then, on behalf of the Club, said how pleased they were to see the Rev. J. F. Blake, one of the best known of the British geologists, with them that day.

JULY 8.—GEOLOGICAL SECTION—Excursion to Tardree Mountain. Mr. Robert Bell acted as conductor. Proceeding by car from Antrim, the first stopping place was on the slope of Carnearney to examine the obsidian here exposed. After several specimens were obtained the party proceeded to the main exposure in a quarry which is being worked at Tardree Mountain. In this quarry a prominent feature is the columnar structure of the rock. This is taken advantage of in working the rock into pillars, sills, kerbs, &c, but, on account of its coarsely crystalline nature, it is not suitable for fine work. The rock, which resembles a granite, is whitish or greyish in colour, and contains porphyritic crystals of sanadine, plagioclase, quartz, mica, and tridymite. After a thorough investigation had been made of the quarry, a start was made for the

Sandy Braes, so called from the rhyolite, which, on weathering, decomposes into fine gravel and sand. There are several exposures throughout the Braes, but, as they are all on a small scale, much difficulty was met with in securing specimens owing to the rock surfaces being greatly weathered. However, the party were rewarded with good examples of the various rocks, the most noticeable being the bluish and pink rhyolites, which are well banded, and show the flow marks very plainly. Attention was also given to the fluidal obsidians which were met with, specimens being quickly annexed by the members.

JULY 29.—The fifth excursion was held to Magheramorne. Forty members and friends assembled at the Northern Counties Railway at 2.45 and took seats in the reserved carriages in waiting. On reaching Magheramorne, by permission of Colonel M'Calmont, M.P., the demesne and glen were thoroughly explored and many specimens obtained. The well-known quarries were next visited, and various fossils extracted by hammer and chisel. After a short business meeting, at which some new members were elected, the members proceeded to examine the Estuarine clays beside the pier. The 8.20 train was taken for Belfast.

BELFAST AND DUBLIN NATURALISTS' FIELD CLUBS.

JULY 12-14.—JOINT EXCURSION TO DUNDALK.—The combined party, which was small in numbers, having reached Dundalk before noon, drove to the first place to be visited, Louth Abbey. On arriving at Dromiskin the round tower, church, and graveyard, were all examined, and again nothing but regret could be expressed at the way the hands of the careless and the vandal are destroying our ancient monuments.

Thursday found the party eager for the day's work, and at 9 o'clock all were again seated in brakes, and were fortunate enough to be accompanied by a large number of the members of the Louth Archaeological Society (under whose guidance the Clubs were for this day), and started for Castletown Castle and the great mound or fort called Dundalgan, which is said to have given the name Dundalk to the town. A little further along the road the very interesting fort of Rosskeagh was examined, and Mr. Tempest gave the party all the information available about this very curious structure. The party then drove to Faughart, where a most interesting group of remains was visited—fort, church, and graveyard. Then past Moira Castle, or what remains of it, a very strong and important structure, once guarding the celebrated Moyra Pass, to the remarkable stone of Kilnasagart.

The next visit was to Ravensdale Park, kindly thrown open for the inspection of the members of the united Clubs. Here the party broke up into various sections. Some visited the gardens, others went botanising through the park, and the remainder went to view and photograph the stone circle lately discovered here by the Rev. N. Lawless, P.P., of Faughart. The next item on the programme was the visit to the great cromlech known as the Giant's Load.

After dinner a business meeting was held—W. F. de V. Kane, D.L., in the chair—when the following resolution was passed:—"That the best thanks of the Belfast and Dublin Naturalists' Field Clubs are due to the Council and members of the Louth Archæological Society for their kind assistance and company during the day."

On Friday, the 14th inst., the 8.48 a.m. train was taken to Ardee. Here the party was met on the platform by Joseph T. Nolan, M.A., President of the Louth Archæological Society, who kindly acted as local guide during the day. The first place visited was the church. They then visited the two ancient castles in the town. Then the party broke up, one section going to Ardee Bog for botanical and conchological purposes; but the main party followed Mr. Nolan to a large fort, situated about a quarter of a mile from the town, called variously the Priest's Mount, Castle Guard, and in the ordnance survey maps Dawson's Court.

The 3 o'clock train was taken back to Dundalk, and in the evening the party broke up and returned to Belfast and Dublin.

NEWS GLEANINGS.

The Dublin Museum.

The appointment of Mr. A. R. Nichols as Assistant Keeper of the Natural History Collections of our National Museum caused the second Assistantship to become vacant. This post has now been filled, we are pleased to learn, by the promotion of Miss Jane Stephens, B.A., B.Sc., who was made Technical Assistant last autumn in succession to Mr. J. N. Halbert.

The Belfast City Museum.

Thanks to the efforts of its new Curator, the Public Museum, Belfast, is showing marked signs of improvement. Some of the wall cases (Ethnography) and other departments of the museum already show evidences of a trained hand, and the marine-store methods are fast disappearing. The Grainger stone implements are emerging from their long hibernation in dusty drawers and dustier stores. Still more pleasant it is to record the courtesy inquirers receive from Mr. Deane, whose exhibit of our wild flowers, freshly gathered week by week, and clearly labelled, are giving much pleasure and instruction to many folk, old and young. The latter may now be seen regularly brought into the Museum to the flower exhibit by both parents and governesses. We witnessed the other day an excellent little demonstration given by a governess to her three young pupils, when there were over forty species on the shelves. These included plants of the meadow, shore, and river bank, with such extras as the Irish Spurge (*Euphorbia hiberna*), &c., and a fine sod of *Drosera rotundifolia*.

NOTES.

BOTANY.

The numbering of the Botanical County-Divisions of Ireland.

The Moss Exchange Club is preparing a Catalogue of Hepaticæ showing the distribution of these plants in the County Divisions throughout Great Britain and Ireland, after the manner of the London Catalogue of British Mosses. A great practical difficulty has arisen in representing the distribution in Ireland. If the numbers used by Mr. Praeger in *Irish Topographical Botany* are used for the Irish county-divisions, then the same numbers will stand for different districts in England and Ireland, and confusion will be sure to result. I think the divisions as arranged by Mr. Praeger are admirable, but that it was a great mistake not to make his numbers to run consecutively with those of Great Britain. We want a numeration which can be used without confusion for the British Isles. Mr. Groves used consecutive numbers in his paper on the distribution of *Characeæ*, and conchologists have done the same in Adams' *Manual of Land and Fresh Water Shells*, and Taylor's *Monograph*. Contractions for the county names have been used in Lett's *Hepaticæ*, and Rogers' *British Rubi*, a troublesome plan not free from confusion where county names begin with the same letter, and which takes no account of divisions in a county itself. The ideal plan would be a numeration of English and Irish county-divisions, according to latitude, as was pointed out by Mr. Praeger in his paper on this subject in the *Journal of Botany*, and *Irish Naturalist*, February, 1896, but I suppose it is too late in the day to do this. I can see no practical way out of the difficulty but, while adopting the 40 county-divisions of *Irish Topographical Botany*, to re-number them, and instead of counting from 1 to 40 to count from 113 to 152. It would be useful if a Catalogue were issued of British Flowering Plants, with the county-divisions arranged like the London Catalogue of Mosses. In that case the revision of numbers I advocate would be essential, and the sooner this or some similar plan is carried out the better.

We owe a debt of gratitude to my friend Mr. Praeger for his labours on the distribution of Irish plants, but I think he was ill advised in the numbers adopted, and that it is not too late to set this right. I shall be glad to know what others think on the subject.

C. H. WADDELL.

Saintfield, Co. Down.

Sisyrinchium angustifolium in Co. Tipperary.

When botanizing along the Co. Tipperary shore of Lough Derg on 12th June, I found a single specimen of *Sisyrinchium angustifolium* in full bloom on a rocky point at Curraghmore. This place is nearly opposite and about three miles distant from the mouth of the Rossmore river.

C. J. LILLY.

Larne.

ZOOLOGY.

Some new stations for *Trichoniscus roseus*.

This very local and usually rare species of woodlouse, easily recognised by its small size, and beautiful rosy colour with a yellow or orange band down middle of back, has again (*I.N.* vol. xiii., p. 260), turned up in several localities, including two which are the first records for the West of Ireland. While visiting the old graveyard in Castle Upton demesne, Antrim, a few days ago, I found a fine bright-coloured specimen, as large as the form from Bushy Park, Dublin; it is likely rare here as I could not find a second specimen. While shell-hunting along the margins of the Shannon, with Mr. J. T. Tatlow, at Castleconnell, Limerick, I found it plentiful but very local under stones about a quarter mile north of The World's End. Some small stones had five or six individuals under them. As I write, a tin box comes to hand from Mr. R. Ll. Praeger containing living specimens from the basement of Glenade House, Co. Leitrim. In April last while on a visit to Mr. Pinion, at The Priory, Grassendale, Liverpool, his boys and I found it abundant in the old garden there. It is much more local in England than in Ireland.

Belfast.

R. WELCH.

***Sirex gigas* in the North.**

This troublesome insect has been much more in evidence than usual here. At least a dozen specimens have come under my notice during the month of July. Three were taken at Cultra, two at Ballymacarrett, two more in other parts of Belfast, while four or five were brought to the Curator of the Municipal Museum to be identified. I saw two flying about one of the principal streets of Belfast on two successive days, and heard of several being seen in Holywood.

ROBERT PATTERSON.

Holywood, Co. Down.

***Psithyrus campestris* in Co. Wicklow.**

Last July and August the Misses Barrington found the above-named parasitic Humble-bee at Fassaroe, Co. Wicklow. The specimens, three in number, are all referable to the very dark variety of this species, with only slight traces of the usual bands of yellow hairs present in the typical form. Although it is a common species in England there are very few Irish records of *Psithyrus campestris*, Panz. In Mr. Freke's list (*Irish Naturalist*, 1896), the only definite locality mentioned is Rosscarberry, Co. Cork. We have, however, in the Museum collection examples of this bee collected by Mr. Freke at Borris and in Co. Kildare, and a dark form similar to the Fassaroe ones collected by Colonel Verbury in the Kenmare district. Mr. H. G. Cuthbert has also recorded (*Irish Naturalist*, 1898), it

from the last-mentioned locality. There are very few Irish records of the species of *Psithyrus*, owing, perhaps, to their close resemblance to the common Humble-bees (*Bombus*), on which they are parasitic. Mr. E. Saunders has kindly verified the identification of the species.

J. N. HALBERT.

Museum, Dublin.

Common Scoter breeding in Ireland.

It is very satisfactory that through the careful investigations of Major Herbert Trevelyan, the Common Scoter has been proved to have hatched out and brought away nestlings this summer on a northern lake about ten miles from the sea. He has announced the facts in the *Field* of July 15th, as follows :—

“ When fishing on one of the larger loughs in Ireland last year, I saw for the first time during the week ending June 11, a pair of ducks that were new to me. Subsequently, on one or two occasions, I observed them with my Zeiss binoculars. A reference to Yarrell's *British Birds* led me to believe they were Common Scoters, and a visit shortly afterwards to the Natural History Museum confirmed me in this belief. Up to my departure from the loughs, on July 1, when seen by me they were always together, and a man whom I gave instructions to watch them, informed me that though he did so from time to time, till about August 18, he never saw them apart. On May 24, this year, and on subsequent occasions, I saw a pair of the same species in the same locality for the last time together on May 30, and the female alone for the first time on June 5. On the morning of June 13 I found her on her nest, which was under a small bush (locally known as a sallagh bush), but otherwise with no attempt at concealment. It was on an island. She allowed me to have a good view of her from about three yards distance, but on advancing another yard, she rose and flew off. There were eight eggs, partially incubated, and all somewhat dirty. The duck was last seen on June 28; on visiting it on the 30th she was away, and the nest was empty, except for a few bits of egg shell. On July 1 I found her on the lough with five young ones. On our boat coming near them she uttered curiously plaintive cries, but did not simulate a wounded bird, contenting herself with rising, flying a few yards from her brood, and settling again. On July 3 I obtained one of the young ones, which, with an egg and some of the down, I submitted to my friend, Dr. Bowdler Sharpe, who kindly identified them, pronouncing them to be those of the Common Scoter (*Edemia nigra*.)” I may add, that Major Trevelyan kindly sent me many communications during the above observations. He described the colour of the female as being like that of the Grey Hen, the female of the Black Grouse; he stated that her cheeks and neck were lighter than the rest of the plumage, that her head was darker than her back, and the colour seemed to come down the back of her neck in a triangular form. He recognized, when he saw her on the nest, that the colour of her eye was

darker than that of the Tufted Duck, a species that breeds numerously there, and that she was a larger bird.

Of the two eggs which he took he kindly sent me one, and after the young had left the nest he sent me the latter, which contained down and feathers. These I sent to Mr. Heatley Noble, who has made a special study of ducks' eggs and down, and who set me right as to a supposed case of the Wigeon breeding in Ireland. Without seeing the duckling Mr. Noble wrote:—"There is no other duck's egg in my collection like yours but the Common Scoter's, and I can match the down and feathers with my nest of this bird, and *no other*." Subsequently he saw the nestling duck taken by Major Trevelyan and had no hesitation in saying it was a young Scoter, thus confirming the opinion previously formed by Dr. Bowdler Sharpe.

The parent duck might have been easily shot, but I congratulate Major Trevelyan in having obtained proof of her species without destroying this bird in her attempt to rear her young in Ireland. One of the eggs and the young duck are in the Natural History Museum, South Kensington, and the other egg and the nest are in the Museum of Science and Art, Dublin, having been kindly presented by the finder.

R. J. USSHER.

Cappagh, Co. Waterford.

Wild Duck's Nest in a Tree.

I saw last season a Wild Duck's nest in a spruce fir tree near here. It was about eighteen feet from the ground. Notwithstanding the fact that the nest, in consequence of the novelty of the situation, was often visited, and the sitting bird alarmed, it was not deserted. All the nine eggs were hatched and the young ones safely removed. Unfortunately no one saw the method adopted by the parent ducks for the conveyance of the young from the nest to the Sixmile-water near. I am indebted to Mr. John White, late gamekeeper to Lord Massereene, for information respecting the nest.

It may be added that during the past few years two other Wild Ducks' nests have been noticed in unusual situations. They occurred near the Dunore river on the eastern side of Antrim Bay, and about three-and-a-half miles from Antrim town. One was on the top of a post about ten feet high, which partly supported the roof of a shed, and the other was in the hollow of a decayed tree trunk, about six feet from the ground.

W. S. SMITH.

Antrim.

Birds of Balbriggan.

To the *Zoologist* for May, Rev. C. W. Benson contributes an article on birds observed at Balbriggan in the years 1903 and 1904. During that period the author has noted ninety-eight species.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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GREENLAND FALCON
Immature Female.
Great Skellig, Co. Kerry.

ICELAND FALCON.
Immature Female.
Oughterard, Co. Galway.

(GREENLAND FALCON.
Adult Male.
Great Skellig, Co. Kerry.

1. face page 201

[G. M. Roche, Photo

ON THE OCCURRENCE OF THE
GREENLAND AND ICELAND FALCONS IN IRELAND,
DURING THE SPRING OF 1905.

BY EDWARD WILLIAMS.

[PLATE 6].

THE first intimation of the arrival of the Greenland Falcon (*Falco candicans*), certainly the handsomer of the two large arctic falcons that occasionally visit Ireland, was conveyed in two letters read by Mr. Barrington, presiding as Chairman at a meeting of the Dublin Naturalists' Field Club. One, dated 13th March, was from the light-keeper on Clare Island lighthouse, asking if there is such a bird as a white hawk, and then describing a bird the size of a sea-gull, which he watched on the 10th March eating a Curlew. The other letter, dated 14th March, was from a retired light-keeper on Owey Island, Kincaslagh, Co. Donegal, who said he was informed by the boys about a white hawk frequenting the cliffs and hills and occasionally the village, and destroying some of the domestic fowl each winter; he writes: "I got a fine opportunity of observing this bird, walking near the top of the highest hill; he flew across my path a little below me and lit on a rock. I was quite exposed, but he did not mind me for about fifteen minutes, then he flew to the cliffs. I observed him closely; he is somewhat larger than the Peregrine, lighter on the back than the Herring Gull, white neck and head, and a little rusty on the end of the wings and tail." The writer then concludes with a lament that he had not a gun to obtain the specimen. There can be very little doubt that the Clare Island bird was a Greenlander. Possibly the other bird mentioned may have been an Iclander.

During the month of March quite a number of Greenland Falcons were obtained along the west coast of Ireland. Mr. H. J. Moran of Carne, Prospect, Belmullet, says:—"Three were obtained; one, an immature male, I received, and two were forwarded to a gentleman near the city, both of which I have seen; judging from their size I should say both were

immature females. Three others were seen along the sand-hills, one being trapped, but afterwards making its escape. Their principal food was rabbits, barn-door fowls, and an occasional duck." The island called the Great Skellig, off the coast of Kerry, supplied three specimens, an adult male and female, and one immature female, which were shot by the light-keepers, and came into my possession. I might mention that during the previous visitation of these birds (1883-1884), several were obtained on the same island, two of which are in the Irish collection in the National Museum. One specimen is mentioned as occurring at Dunfanaghy in the current volume of the 'Irish Naturalist' (p. 119), and one was trapped on 9th April by the game-keeper on Mr. Orme's property at Crossmolina, Co. Mayo, a female in nearly adult plumage. I have also had the opportunity of examining another shot in the month of March at Mizen Head, Co. Cork, a very large immature female, with the wings and tail greatly barred.

At a meeting of the Dublin Naturalists' Field Club on March 31st, I had the pleasure of exhibiting an immature female Iceland Falcon (*Falco islandus*) which had been obtained at Oughterard, Co. Galway. The game-keeper belonging to a gentleman in the district, hearing a great commotion amongst his poultry, rushed out, and was just in time to secure the fine specimen which occupies the centre of the photograph (Plate 6), accompanying this paper. Another was seen, probably a male, but was not obtained, although seen about the district for some time afterwards. I may here remark that *Falco islandus* can always be distinguished from *F. candicans* by the dark ground with light edges to the feathers, whereas in the latter the groundwork is always white, with dark spots or longitudinal marks according to the age of the bird. It would thus appear that nine specimens of the Greenland Falcon were actually obtained to one Iceland Falcon, a strange fact that the bird resident so near our shores should be the much rarer visitant to our coast, this being the third Irish specimen in existence. According to Mr. Ussher in his invaluable work on the Birds of Ireland, the Greenland Falcon has been obtained nineteen times; if we include the nine mentioned above, it brings the total to twenty-eight

Greenland Falcons compared to three Iceland, which gives a very fair idea of the rarity of the Iceland Falcon in Ireland.

I now give weights and measurements.

Iceland Falcon (female) weight 3 lbs. 14 ozs. Spread of wings, 4 feet 3 inches. From point of beak to point of tail, 23 inches.

Greenland Falcon (female), weight 3 lbs. 11½ ozs. Extent of wings, 2 feet 10 inches. From point of beak to tail 21½ inches. In the adult Greenland Falcon the legs and cere were a very pale yellow, in the immature birds the legs and cere pale bluish grey, as were those of the Iceland Falcon. The irides in all ages a dark hazel. Four of the birds were obtained in Co. Mayo, three in Kerry, one in Donegal, and one in Cork.

For the following facts as regards the distribution of the Greenland Falcon I am indebted to Yarrell's "British Birds," Vol. 1, page 39.

The Greenland Falcon seems to be most plentiful in the inhospitable regions which enclose Baffin's Bay, and extend to the westward.

From this tract adult birds seldom wander to other lands, though the young, especially in autumn and winter, occur regularly in Iceland and not unfrequently in the Dominion of Canada from Newfoundland (where according to Mr. Reekes it is a regular visitant in the fall) westward, in the United States, the British Islands and even countries still more remote from the place of their birth. They are no doubt driven away by their parents, as is commonly the habit of birds of prey, and follow the large flocks of waterfowl which are bred in the north on their southward migration, though it would appear the Ptarmigan forms the chief sustenance of the old birds. At the same time it must not be supposed that in Greenland the white form only is found. In the southern districts of that country the Iceland Falcon is certainly more numerous, and on the other hand, there is good reason for believing that the Greenland Falcon occurs in some of the southern parts of British America, and perhaps even in the Old World.

Writing of what doubtless is this form of falcon, Sir John Richardson in the "Fauna Boreali-Americana" says, "In the middle of June, 1821, a pair of these birds attacked me as I

was climbing in the vicinity of their nest, which was built on a lofty precipice on the borders of Point Lake, 65°. They flew in circles, uttering loud and harsh screams, and alternately swooping with such velocity, that their motion through the air produced a loud rushing noise; they struck their claws within an inch or two of my head. I endeavoured by keeping the barrel of my gun close to my cheek, and suddenly elevating its muzzle when they were in the act of striking, to ascertain whether they had the power of instantaneously changing the direction of their rapid course, and found they invariably rose above the obstacle with the quickness of thought, showing equal acuteness of vision and power of motion; although their flight was much more rapid, they bore considerable resemblance to the Snowy Owl." Sir John also remarks that at the season which he saw them, the ground was still partially covered with snow, and the lakes with ice, but that this bird, like the owl just mentioned, is well adapted, "from the whiteness of its plumage, for traversing a snowy waste without alarming the birds on which it preys." And further that when the falcon pounces upon a flock of Ptarmigan, the latter endeavour to save themselves by diving instantly into the loose snow, and making their way into it a considerable distance.

The photograph (plate 6) which accompanies this paper represents the Iceland Falcon in the centre, and shows very clearly the dark ground with the pale edge-marking. The bird on the right hand is a singularly beautiful adult male Greenland Falcon, head, breast, and tail spotless white, while the back and wings are dotted over with transverse dark spots, the legs and cere a very pale yellow. The bird on the left is an immature female Greenlander, showing the dark markings of immaturity.

Dublin.

NOTES ON THE INVERTEBRATE FAUNA OF SKERRIES, CO. DUBLIN.

BY NATHANIEL COLGAN, M.R.I.A.

AMONGST the many branches of nature study which have been treated of in these pages from time to time, perhaps marine zoology has occupied least space. And yet there are few pursuits of greater interest than the dredging which furnishes to the student of sea life his indispensable raw material. Dredging, in fact, may be regarded as a species of angling, and shares with angling, properly so-called, all the fascination that comes from the uncertainties and wide possibilities of its results. The unexpected is perpetually happening, and yet not with sufficient frequency to dull the edge of appetite. Though you may draw blank after blank in your day's work, the moment when the dredge-net swims into your ken in the blue water at the stern of your boat, as the last couple of fathoms of dripping rope are hauled in, is always one of excitement even for the experienced dredger. For custom can never quite stale the infinite variety of the hidden world of the sea-floor which the dredge can but blindly grope along.

It is, however, the novice in marine zoology who enjoys the full zest of dredging. Nine-tenths of his hauls bring him up something strange, some living mollusc which he has known hitherto only from its worn shell cast up on the shore—some brilliant star-fish or urchin with its wonderfully complex organism in full activity, or some delicate form of zoophyte rooted in the battered valve of a scallop. The present notes are written by just such a novice. They give, in condensed form, the results of his first essay in sea-dredging, carried on during the course of a quiet holiday at Skerries in July last. It need hardly be said that the notes aim rather at arousing interest in what is, perhaps, a somewhat neglected branch of nature study in Ireland than at adding anything really new to our knowledge of the well explored sea-fauna of Co. Dublin. And if the intrusion of a mere beginner into the abstrusities of marine zoology calls for justification, I would only quote

the apt words of Thomas Fuller when he sat down to write an account of Wales—a country he had never seen:—"It matters not," he says, "how meanly skilled a writer is so long as he hath knowing and communicative friends." The writer of these notes, having spent some eight months in a very desultory study of his subject along the shores of Co. Dublin, can hardly claim to have so open a mind in matters of marine zoology as was Fuller's in Welsh topography; but he is quite as happily circumstanced in the matter of "knowing and communicative friends."

In naming some of the more critical species of mollusca I have received valuable assistance from Mr. A. R. Nichols, whose list of the Marine Mollusca of Ireland¹ is so indispensable to the student of distribution. I have to thank Mr. Nichols, too, for naming my small collection of Polyzoa. Miss Jane Stephens who, in her recently published list of Irish Coelenterata,² has so well summed up our present knowledge of this branch of marine zoology, has been good enough to examine some of the more puzzling zoophytes, and a few sponges and sea worms, while Professor Carpenter has kindly named the pycnogons.

The dredging trips whose results are given here were five in number. They extended no farther seaward than Rockabill, some five miles from Skerries harbour, nor did any of them carry the dredge into soundings deeper than $15\frac{1}{2}$ fathoms, low water. The boats used were the ordinary row boats of the local line and lobster fishermen—rather roomy, steady craft of broad beam, and carrying sail enough to enable us to change ground or run home rapidly on the rare occasions when the wind was favourable. Twenty-four effectual hauls were made. These were so distributed as to test all the different types of bottom known to the fishermen. Stiff mud, mixed mud and sand, gravel, and pure sand, were all sampled again and again, and one or two cautious scrapes were made over rocks. The best ground was found to lie north and east of St. Patrick's Island, or Church Island, as it is called by the Skerries folk. The deepest scrape, and perhaps the

(¹) *Proc. R.I.A.*, 3rd Ser., vol. v., no. 4, 1900.

(²) *Proc. R.I.A.*, vol. xxv., Sec. B., no. 3, 1905.

most productive of all, was made in a $15\frac{1}{2}$ -fathom hole about midway between Church Island and Rockabill.

The survey of the ground thus made may be considered as fairly exhaustive, and if the knowledge gained by a few months of desultory shore collecting along the Dublin coast be enough to justify a general statement, I would say that the Skerries sea-fauna is a rather poor one for the county. Special attention was paid to the Skerries mollusca, and, adding together the results of dredging and shore collecting, the total of species secured, living or dead, was but ninety. Of this number, forty-five, or precisely one half, were found living.

In notes, such as these, written by a beginner for beginners, a few words on what may be called the technique of coast dredging may be given. The chief points to be attended to are the following:—(a) Let each cast of the dredge be preceded by a sounding, and a note of the depth found. (b) Except when working in stiff mud or pure sand, it is well to use a long line, say $2\frac{1}{2}$ times as long as the depth of your sounding. This has two advantages—the obvious one, that it ensures a good “bite” of the dredge scraper—the less apparent one, that it prevents a sudden strain on the gear should the dredge foul a rock. (c) Unless your dredge be heavily weighted, tow with the tide or current. If you tow against it with a dredge of ordinary weight, the scraper will be kept lifted off the bottom, and after your men have bent their backs to the oars for a quarter of an hour you will haul up a perfectly clean dredge. A little practice will enable you, by feeling the pulse of the tow line, to learn whether the dredge is scraping or floating. The rope thrills and throbs when the dredge is biting—it keeps a steady tautness when it lifts against a current. (d) Take with you on each cruise three or four galvanized buckets, and a half dozen wide-necked jars—ordinary peach or pine-apple jars, with a cord handle to lift by, will do admirably; for you must isolate the fruits of each haul, and preserve them living for a time in fresh sea water if you wish to determine the various species accurately, and note their range in depth. When a full dredge net comes up, and there is no suitable accommodation on board for its varied and possibly valuable contents, then the minor morals of the dredger are apt to go by the board.

You need not take out a change of clothing with you or a suit of oil-skins. If you are really in earnest with your dredging you will probably be wet through from the hips downward by the time your third haul has been dealt with, for you have already handled some 150 fathoms of dripping rope, and sat down once or twice in a puddle where the streaming dredge net rested as it came on board half filled. But it is warm summer weather, salt water is preservative, and, unless it is your first day's dredging, you will not find it necessary when you reach home to attend to the comfort of your marine spoils in the matter of fresh sea-water and roomier quarters, until after you have changed into dry clothes.

As a large proportion of the species dredged around Skerries were quite common for East Ireland, space will not be occupied here by a complete list. Only the more interesting species will be treated of in some detail, and before doing so a specimen "log" will be given showing the precise results of one of the more successful hauls. The living and dead species of Molluscs are arranged separately, a species found both living and dead being entered only in the living list, and except where otherwise stated the dead bivalve species may be taken as having occurred only in the form of single valves. Of the Zoophytes, only the more conspicuous were attended to, the microscopical species being passed over from lack of time, or of appliances for their examination in a living state. No attempt was made at preserving all the Polyzoa included in the dredgings, and little or no attention was given to the Worms or Sponges. The lists, in fact, aim at completeness only as regards the Mollusca and Echinodermata. The nomenclature adopted throughout these notes is Jeffreys' 'British Conchology' for the Mollusca, Forbes' 'History of the British Starfishes' for the Echinoderms, Bell's 'British Stalk-eyed Crustacea' for the Crabs, Hincks' 'British Hydroid Zoophytes' for the Zoophytes, and the same author's 'British Marine Polyzoa' for the Polyzoa.

Log 6.—*July 18th, 1905.*—14 fathoms; about one mile N. by E. of Church Island. Coarse gravel and sand. A haul of very varied contents, though yielding nothing of great rarity.

Total of species determined, 67, made up as follows :—
Molluscs, 41; Echinoderms, 3; Crustacea, 4; Polyzoa, 8;
Zoophytes, Sponges, &c., 10; Pycnogons, 2.

MOLLUSCA (living).

Natica catena, 1.
Velutina lævigata, 1.
Rissoa parva var. *interrupta*, 1.
Aporrhais pes-pelecani, 2.
Trophon muricatus, many.
Nassa incrassata, many.
Buccinum undatum, many.
Nucula nucleus, 4.
N. nitida, 2.
Pecten opercularis, 3.

MOLLUSCA (dead).

Trochus zizyphinus.
Natica Alderi.
Littorina littorea.
Turritella terebra
Murex erinaceus.
Defrancia gracilis.
Pleurotoma turricula.
Mytilus modiolus.
Pecten varius.
P. maximus.
P. tigrinus.
Cyprina islandica.
Axinus flexuosus.
Scrobicularia alba.
Venus exoleta.
V. linctæ, 1 double.
V. fasciata.
V. gallina.
V. ovata, frequent.
Lucinopsis undata, 1 double.
Tapes virgineus, frequent.
Cardium echinatum.
C. nodosum, 1 double.
C. fasciatum, 1 double.
Psammobia ferroensis.
Mya truncata.
M. arenaria.
Corbula gibba.
Solen pellucidus.
S. ensis
Saxicava rugosa.

ECHINODERMATA.

Ophiura albida, many.
Solaster papposa, 1.
Echinus sphaera, 3.

CRUSTACEA.

Stenorynchus phalangium,
many.
Hyas araneus, many.
Portunus pusillus, many.
Pagurus Bernhardus, abundant.

PYCNOGONS,

Nymphon rubrum, 3.

POLYZOA.

Scrupocellaria scruposa.
Gemellaria loricata.
Bugula flabellata.
B. avicularis.
Cellepora avicularis.
Crisia eburnea.
Bowerbankia imbricata.
Cellaria sinuosa.

ZOOPHYTES AND SPONGES.

Campanularia verticillata.
Halecium halecinum.
Sertularella polyzonios.
Diphasia rosacea.
Sertularia cupressina.
Hydrallmania falcata.
Antennularia ramosa.
Alcyonium digitatum, many.
Sycon coronatum, 1.
Suberites domuncula, 1.

Having shown in this list the varied contents of a successful haul, it remains only to set out the more interesting results of the dredgings as a whole :—

Chiton cinereus.—Apparently rare ; detected only in two hauls, in 12 fath., quite close to Rockabill, and in 13½ fath. E. of Church Is., 2 living specimens in each.

Velutina laevigata.—Only once taken, a single living specimen in 14 fath. I have never found this in shore collecting in Co. Dublin.

Adeorbis subcarinatus.—One dead shell in 13 fath. 2 miles E. of Shennick's Is.

Skenea planorbis.—Abundant on sea weeds at low water, Red Is. Distributed all along the Dublin coast, where I have gathered it, chiefly on *Laurencia pinnatifida*, at Ballybrack and at Balbriggan.

Trophon muricatus.—Quite a nest of this species was encountered in 14 fath. N. by E. of Church Is., 22 specimens living or dead coming up in the net.

Defrancia gracilis.—Twice brought up, once in 13½ fath. E. of Church Is. (a single shell), and again in 14 fath. (2 shells), all three shells large and perfect but empty. Dredged off Skerries by Walpole more than 50 years ago.

D. linearis.—Brought up in 4 different hauls ranging from 8 to 14 fath., 6 specimens in all, none living but the shells quite fresh.

Pleurotoma costata.—One specimen in shell sand, Skerries beach. Quite frequent on the Shelly Bank, Dublin Bay, August, 1905.

P. turricula.—A single dead specimen at 13 fath. and another at 14 fath. off Church Is. Also dredged at Skerries by Walpole upwards of 50 years ago. Not infrequent on the North Bull and Shelly Bank, Dublin Bay, where I gathered it in June and August last. One of the North Bull specimens measured fully ¾ in. in length.

Utriculus obtusus, } —Both brought up dead in the same haul from 8
U. truncatulus, } fath. off Colt Is., only two examples of each.
The first species I found rather frequent in shell sand at North Bull in June last.

Philine aperta.—In great profusion, living, in stiff mud near the mouth of Skerries Harbour at a depth of from 3 to 4 fath., some hauls here bringing up fully 50 specimens of all sizes from ¼ in. to 1½ in. A single shell brought up from 13 fath. between Church Is. and Rockabill. Though a common species, I have not so far found either the animal or the shell cast up on the Dublin coast.

Dentalium entalis.—Living in three distinct hauls from 8, 13, and 15½ fath., but not abundant, the largest number in any one haul being 3.

Nucula nitida.—Living in several hauls from 3 to 13 fath. Most frequent at depths from 3 to 4 fath. in mixed sand and mud, fully a dozen specimens coming up in one haul. *N. nucleus*, though found living here at 13 and 14 fath., was much rarer.

Modiolaria marmorata.—A single living specimen from 12 fath. quite close to Rockabill,

Pecten maximus.—Three well grown living specimens from 15½ fath., between Rockabill and Church Is., along with numerous living examples of *P. opercularis*.

P. tigrinus.—A single valve from 8 fath. and another from 14 fath.

Axinus flexuosus.—One, living, from 13 fath.; single valves from 8, 13, and 14 fath. Rather frequent in shell sand at North Bull in June last, and at the Shelly Bank in August last.

Tellina donacina.—A single valve from 8 fath.

Scrobicularia prismatica.—A single valve from 13 fath.

Cardium exiguum.—A single valve from 3 fath.

C. fasciatum.—One living from 8 fath. : valves from 13 and 14 fath.

C. nodosum.—Seven living examples from 8 fath. : numerous valves from 13 and 14 fath.

Solen pellucidus.—Two double valves from 13 fath. : many single valves from 5 distinct hauls ranging from 4 to 13 fath.

Thracia distorta.—A single valve from 13 fath. north of Church Is.

Of the few Polyzoa collected, the most frequent was *Bowerbankia imbricata*. This was brought up at almost every haul from 8 to 15½ fath., and in some cases was very luxuriant, exceeding 4 inches in height. To the Zoophytes already listed as included in the 14 fath. haul, the other hauls added but 3 species, *Eudendrium ramosum*, *Antennularia antennina*, and *Plumalaria Catharina*; all of these occurred but once. Of all the Zoophytes noted, the commonest was *Campanularia verticillata*, which appeared in every haul from 8 fathoms downward. Next in frequency came *Antennularia ramosa*, *Hydrallmania falcata*, and *Halecium halecinum*, the first of these often a very beautiful object, as its bright orange branchings came to the surface. One example from a depth of 13 fathoms E. of Church Is. measured fully 10 inches in height and in spread of branches. This even extorted the admiration of the boatmen, who, speaking of the contents of the dredge-bag in general, had been careful to let me know that they “put no pass on them things,” to “put pass on” being the Skerries idiom equivalent to “set value on.”

The Echinoderms collected, being but few, may be set out here in full:—

Comatula rosacea.—Quite rare. One perfect example from 13½ fath., and several broken arms from 13 fath. When placed in spirit the single specimen captured exuded its exquisite carmine dye, which in a few seconds tinged the whole contents of the phial.

Ophiura texturata.—Common in all the deeper hauls. In one from 13 fath. the dredge appeared to have passed over a battle ground of this species, most of the larger specimens brought up (some with a disk $\frac{7}{8}$ in. diameter, and with $5\frac{1}{4}$ in. spread of arms), having one or more of the arms repaired by a fresh growth, slender young arms growing out from thick stumps fully twice their diameter.

O. albida.—Very common in the hauls from shallower water.

Ophiocoma rosula.—Frequent from 12 to 15 fathoms, and extremely variable in colour.

Uraster rubens.—Rather rare. One 8 inch in diameter from 13 fath., two from 12 fath., and two from $15\frac{1}{2}$ fath.

Solaster papposa.—Rare. One specimen from 13 and another from 14 fath.

Asterias aurantiaca.—Very rare. Only one specimen, a full grown one, from a depth of $13\frac{1}{2}$ fath., was brought up in the whole series of 24 hauls.

Echinus sphaera.—Not infrequent from 4 to $15\frac{1}{2}$ fath. One fine example measuring $12\frac{1}{2}$ inches in circumference, without the spines, was dredged living in 12 fath. N. E. of Church Is.

Amphidotus cordatus.—Very common, cast up on the sandy shores at low water, but not once captured in the dredge, although the characteristic spoon-shaped oral spines were detected in many of the hauls from deep water.

No special attention was paid to the Crustaceans, but the following species of crabs were observed either in the dredgings or by the shore:—two Spider Crabs, *Stenorynchus phalangium* and *Hyas araneus*, and one Hermit Crab, *Pagurus Bernhardus*, were common, appearing in almost every haul, and sometimes in abundance, from 5 to $15\frac{1}{2}$ fathoms; the Porcelain Crab, *Porcellana longicornis*, and two Swimming Crabs, *Portunus depurator* and *P. pusillus*, were all three dredged in $15\frac{1}{2}$ fathoms, and the third again in 14 fathoms, but none of these appeared to be common, and of the second only one specimen was captured. Adding to these the ubiquitous Red Crab, *Cancer pagurus*, and Shore Crab, *Carcinus maenas*, the total of crabs observed was but eight. Only two species of Pycnogons were dredged, *Nymphon rubrum*, already mentioned, and *Pycnogonum littorale*. The first was brought up twice, three specimens in one haul and two in another; of the second species, only a single specimen was captured, in 13 fathoms.

In conclusion, a few of the Skerries local names for sea animals may be given. These were all found current amongst the Skerries fishermen in July last. The Limpet (*Patella vulgata*) is called Barnacle, and the Whelk (*Buccinum undatum*)

Walk. The Common Mussel is known as Muskel, *Trochus umbilicatus* as Bachelor's Button, and the Large Scallop (*Pecten maximus*) as Lamp Shell. Two of the older fishermen told me they recollected having seen the scallop shells filled with fish oil and used as lamps in Skerries cabins many years ago. The popular Skerries names for the crabs and star-fishes yielded three evident survivals from the Gaelic—Parthawn for the Long-legged Spider Crab (*Stenorynchus phalangium*), Crossāne for the Common Starfish (*Uraster rubens*), and Morane for the Lesser Sand-star (*Ophiura albida*). The restriction of the Gaelic "Parthawn," the original of the Lowland Scotch Partan, to the economically worthless Spider Crab is interesting. Originally the Gaelic word was probably used at Skerries, and throughout the Fingal district of Co. Dublin, generically for all the crabs, including the edible species, *Cancer Pagurus*, the Great or Red Crab. But this edible crab, being an article of trade between the Fingal fishermen and English-speaking dealers and consumers, has had gradually imposed upon it the English name Red Crab, by which it is now known at Skerries, while its despised long-legged relative, being never mentioned in such trading intercourse, retained the old Gaelic name.

Sandycove, Co. Dublin.

NOTES ON THE MOLLUSCA OF COUNTY LOUTH.

BY P. H. GRIERSON.

THE following are notes taken on the Mollusca of County Louth during the years 1904—1905. Though it is the smallest county in Ireland, without any very large lakes, yet it has proved to be one of the richest in Mollusca, having yielded 88 species.

The county comprises portions of the following sheets of the one-inch Ordnance Map—60, 70, 71, 81, 82, 91, 92. My endeavour has been to procure specimens of each species from one or more localities in each sheet, and in my list I give the number of the sheet where found, together with the name of the nearest town or well known demesne.

I have, as usual, followed Dr. Scharff's nomenclature as given in *Irish Naturalist*, 1892. I am much indebted to Mr. Chas. Oldham for help given in determining the various species and varieties.

- Vitrina pellucida**, Müll.—Dundalk; Flurry Bridge (70). Ballymascanlon; Omeath; Ravensdale (71). Darver; Collon (var. *depressiuscula*) (81). Annagassan; Barmeath; Clogher (82). Townley Hall (91). Beaulieu (92). Common nearly everywhere, except the var. *depressiuscula*, which, though plentiful at Collon, I did not find elsewhere.
- Hyalinia cellaria**, Müll.—Dundalk; Flurry Bridge (70). Omeath (var. *albina*); Carlingford; Grange (71). Ardee; Collon (81). Dunany; Barmeath; Blackhall (82). Mellifont Abbey; Townley Hall; near Drogheda (91). Beaulieu and Baltray (92). Common; the variety found at Omeath is a very delicate pretty shell.
- H. alliaria**, Müll.—Near Narrow Water (60). Ravensdale; Omeath; Carlingford (71). Collon (81). Townley Hall (91). Beaulieu (92). Fairly common; the variety *viridula* was taken at Narrow Water, Townley Hall, and Beaulieu.
- H. nitidula**, Drap.—Narrow Water (60). Dundalk; Flurry Bridge (70). Omeath; Ravensdale (71). Ardee; Collon (81). Townley Hall (91). Beaulieu (92). Not common.
- H. pura**, Alder.—Dundalk; Flurry Bridge (var. *nitidosa*) (70). Ballymascanlon; Omeath (71). Collon (81). Barmeath (82). Townley Hall (var. *nitidosa*) (91). Beaulieu (92).
- H. radiatula**, Alder.—Dundalk; Blackrock (70). Ravensdale (var. *viridescens-alba*); Carlingford (71). Ardee; Darver (81). Townley Hall (91). Rather scarce. I did not take these shells in sheets 82, 92.
- H. crystallina**, Müll.—Dundalk; east of Inniskeen; Flurry Bridge (70). Ballymascanlon; Ravensdale; Omeath; Bush Station (71). Collon (81). Salterstown; Barmeath; Lough Drumshallon (82). Townley Hall (91). Beaulieu (92).
- H. fulva**, Müll.—East of Inniskeen; Blackrock; Flurry Bridge (70). Ballymascanlon; Ravensdale; Carlingford; Bush Station (71). Ardee (81). Barmeath; Blackhall (82). Townley Hall, and near Drogheda (91). Beaulieu (92). Common in moist situations.
- H. nitida**, Müll.—Kilcurry (70). Near Bush Station (71). Ardee (81). Near Blackhall; Lough Drumshallon (82). Beaulieu (92). Scarce.
- Arlon ater**, L.—Narrow Water (var. *brunnea*) (60). Dundalk (70). Carlingford (vars. *aterrima*, *reticulata*, *oculata*, *brunnea*); Omeath (71). Ardee; Darver; Dromiskin (81). Barmeath; near Blackhall demesne (var. *brunnea*) (82). Mellifont Abbey (91). Beaulieu (92). Common.
- A. subfuscus**, Drap.—Narrow Water (60). Dundalk (70). Omeath (71). Dromiskin; Ardee (81). Togher; Blackhall Demesne (var. *brunnea*) (82). Mellifont Abbey (91). Beaulieu (92). Fairly common

- A. hortensis**, Fér.—Narrow Water (60). Dundalk; Louth (70). Omeath; Carlingford (71). Ardee; Drumcar (81). Barmeath; Blackhall demesne (82). Mellifont Abbey (91). Beaulieu (92). Not uncommon.
- A. circumscriptus**, Johnst.—Louth (70). Omeath (71). Drumcar; Ardee (81). Annagassan; Barmeath; Blackhall (82). Mellifont Abbey (91). Beaulieu (92). Common.
- A. intermedius**, Normond.—Ardee; Drumcar; Collon (81). Annagassan; Blackhall (82). Townley Hall (91). Beaulieu (92). Fairly common.
- Testacella scutulum**, Sow.—Miss Sidney Smith sent me a dozen specimens from Piperstown garden (82), where they are very plentiful, and mentioned that she had taken them in her garden at Greenhills, near Drogheda (92). I made many enquiries among farmers in the district, but was unable to obtain specimens from the open fields, though several people said they often saw them when ploughing in the springtime.
- Limax maximus**, L.—Narrow Water (var. *sylvatica*) (60). Dundalk (70); Ardee (81). Blackhall (var. *Ferussaci*) (82). Mellifont Abbey (91). Beaulieu (92). Fairly well distributed.
- L. flavus**, L.—Louth (70). Carlingford (71). Ardee (81). Togher (82). Near Drogheda (92). Not common. I have only found it near houses.
- L. marginatus**, Müll.—Narrow Water (60). Dundalk (70). Omeath; Carlingford (71). Collon; Dromiskin (var. *bettonii*) (81). Blackhall (82). Mellifont Abbey (91). Beaulieu (92). Common in woods.
- Agriolimax agrestis**, L.—Dundalk (var. *sylvatica*) (70). Omeath; Carlingford (71). Dromiskin; Ardee (81). Annagassan; Barmeath (82). Mellifont Abbey (91). The commonest of all the slugs; said to do much injury to crops in spring.
- A. lævis**, Müll.—Castlerocke (70). Carlingford (71). Ardee and near Castlebellingham (81). Blackhall (82). Beaulieu (92). Fairly common in marshy ground, but easily overlooked.
- Amalia Sowerbyi**, Fér.—Carlingford (71). Drumcar; Ardee (81). Barmeath; Blackhall (82). Mellifont Abbey (91). Baltray (92). Not very common.
- A. gagates**, Drap.—Dundalk (var. *rava*) (70). South of Carlingford (var. *plumbea*) (71). Dromiskin; Drumcar (81). Annagassan (82). Baltray (92). Not common.
- Helix pygmæa**, Drap.—Narrow Water (60). Flurry Bridge; east of Inniskeen; Dundalk (70). Ballymascanlon; Ravensdale; Omeath (71). Darver; Collon (81). Barmeath; Lough Drumshallon (82). Townley Hall (91). Beaulieu (92). Well distributed.
- H. rotundata**, Müll.—Narrow Water (60). Dundalk; Flurry Bridge (70). Ballymascanlon; Omeath (71). Drumcar; Darver (81). Dunany; Barmeath (82). Mellifont Abbey; Townley Hall (91). Beaulieu; Baltray; (92). To be found nearly everywhere.

Helix rupestris, Drap.—Castlerocke; near Dundalk (70). Drogheda (91). Very uncommon.

H. pulchella, Müll.—Dundalk (70). Ballymascanlon (var. *excentrica*); Grange; Bellurgan (var. *excentrica*); Carlingford (vars. *costata* and *excentrica*) (71). Ardee; Collon; Dromiskin (81). Dunany; Clogher; Barmeath (var. *costata*); Salterstown (vars. *costata* and *excentrica*) (82). Townley Hall (var. *costata*) (91). Baltray (92).

This newly discovered variety, or as it is now called, *Helix* (*Valloula*) *excentrica*, appears to be rather common in the counties of Meath and Louth.

H. aculeata, Müll.—North of Dundalk; Flurry Bridge (70). Ballymascanlon (71). Collon (81). Townley Hall (91). Beaulieu (92). Not common except in a district over 2 miles north of Dundalk.

H. lamellata, Jeffr.—Flurry Bridge (70). Ravensdale demesne (71). I could not get it in any other district in Co. Louth.

H. hispida, L.—Dundalk; Flurry Bridge; Lough Cortail (70). Ballymascanlon; Omeath; Bush station (71). Ardee; Collon (81). Dunany; Barmeath (82). Mellifont Abbey; Townley Hall (var. *albo-cincta*) (91). Beaulieu (92). Very common.

H. rufescens, Penn.—Dundalk (70). Omeath; Carlingford (71). Ardee (81). Dunany; Blackhall (82). Townley Hall (var. *albo-cincta*); near Drogheda (var. *alba*) (91). Beaulieu (92). Fairly common.

[**H. fusca**, Mont.—I have not been able to find this shell in the county, but I believe it should be taken in the glen south of Ravensdale House, or possibly in Townley Hall demesne. I took it in counties Armagh and Down, adjacent to Co. Louth.]

H. pisana, Müll.—Termonfeckin; Clogher (var. *alba*) (82.) Baltray (92). Miss Sydney Smith mentioned that she took this snail close to Drogheda. It is distributed along the coast from the mouth of the Boyne to just south of Clogher Head. I could not find it at any more northerly station.

H. virgata, Da Costa.—Dundalk (70-71). Ballymascanlon (71). Ardee; Dromiskin (81). Termonfeckin (type and var. *lutescens*); near Blackhall; Barmeath (82). Townley Hall (var. *lutescens*), and close to Drogheda (91). Baltray (92). Common locally.

H. intersecta, Poir.—Dundalk (70). Ballymascanlon (71). Dunany; Barmeath (82). Townley Hall and near Drogheda (91). Not common.

H. ericetorum, Müll.—This species is very rare in the county. I only took a few living specimens at Dromin railway station, where they may possibly have been imported with gravel.

H. acuta, Müll.—Ballagan (71). Dromiskin (81). Annagassan; Clogher (varieties *flammulata*, *articulata*); Salterstown (var. *strigata*); Termonfeckin (82). One mile north of Drogheda (91). Baltray (92). Common along the coast south of Dromiskin; not common on the more northern coasts. Very scarce inland.

H. nemoralis, Müll.—Dundalk (70). Ballymascanlon; Bush station (71). Dromiskin; Ardee (81). Barmeath (82). Mellifont Abbey (91). Beaulieu; Baltray (92). Common in most localities.

- Helix hortensis**, Müll.—Ardee, and 5 miles north on old Carrickmacross road (81) were the only localities in which I took it, and the shell was not plentiful. Miss Sydney Smith showed me some *H. nemoralis* taken near Termonfeckin; there was one *H. hortensis* among them (92).
- H. aspersa**, Müll.—Dundalk (70-71). Ballymascanlon; Omeath; Grange (var. *undulata*) (71). Ardee; Dromiskin (81). Annagassan (82). Mellifont Abbey (91). Beaulieu; Baltray (92). Fairly common in most places.
- Bulimus obscurus**, Müll.—Ardee (type and var. *albina*) (81). Townley Hall (91). Rare; taken in both places on or close to limestone.
- Cochlicopa lubrica**, Müll.—Dundalk; Blackrock; Cortail (70). Ravensdale; Omeath; Carlingford (71). Ardee (type and var. *hyalina*); Darver; Collon (81); Dunany; Barmeath (82). Townley Hall (type and var. *hyalina*) (91). Beaulieu; Baltray (92). Common everywhere.
- Cœcilianella acicula**, Müll.—Three miles north of Dundalk (70). Carlingford (71). Ardee (81). E. and W. of Drogheda (91-92). Fairly common in the south of the county in the limestone district; rare, except in one quarry hole at Ardee, and very rare north of Dundalk.
- Pupa anglica**, Fér.—East of Inniskeen (70). Ballymascanlon (71). Collon (81). Townley Hall (type and var. *pallida*) (91). Rare; found very locally.
- Pupa cylindracea**, Da Costa.—Dundalk (70). Ballymascanlon; Omeath; Carlingford (type and var. *curta*) (71). Annagassan; Ardee; Darver (81). Dunany (82). Mellifont Abbey; Townley Hall (91). Beaulieu; Baltray (92). Common everywhere.
- P. muscorum**, Müll.—Dundalk (70). Ballymascanlon; Omeath (71). Dromiskin; Ardee (81). Barmeath; Dunany (82). Townley Hall (var. *brevis*) (91). Drogheda (92). Fairly common along the coast, rare inland.
- Vertigo edentula**, Drap.—East of Inniskeen (70). Ballymascanlon; Omeath; Carlingford (71). Collon (81). Barmeath (82). Townley Hall (91). Rather common in old plantations.
- V. pygmæa**, Drap.—Dundalk; Blackrock (70). Ravensdale; Omeath; Carlingford; Bellurgan (71). Salterstown (82). Baltray (92). Rare, except near the sea coast.
- V. substriata**, Jeffr.—Ravensdale; near Bush station (71). Ardee; Collon (81). Lough Drumshallon (82). Townley Hall (91). By no means common.
- V. antivertigo**, Drap.—East of Inniskeen; Blackrock (70). Carlingford and south of Bush station (71). Ardee; Collon (81). Barmeath (82). N. of Townley Hall and near Drogheda (91). Common in marshy places.
- Balea perversa**, L.—Louth (70). Carlingford (71). Ardee; Collon (81). Blackhall (82). Townley Hall (91). Baltray (92). Very local.
- Clausilia bidentata**, Ström.—Dundalk (70). Ballymascanlon; Omeath; Carlingford (71). Collon (81). Annagassan; Barmeath (82). Townley Hall (91). Beaulieu; Baltray (92). Fairly common.

- Succinea putris**, L.—Blackrock (70). Grange (71). Ardee (81). Lough Drumshallon (82). Townley Hall (91). Beaulieu (92). Not very common.
- S. elegans**, Risso.—Dundalk (70). Ballagan (71). Ardee (81). Blackhall (82). Beaulieu (92). Not common.
- Carychium minimum**, Müll.—Dundalk (70). Ballymascanlon; Omeath; Carlingford (71). Ardee; Collon (81). Barmeath; Lough Drumshallon (82). Townley Hall (91). Beaulieu (92). Common in most damp situations among leaves and moss, &c.
- Alexia denticulata**, Mont.—Dundalk (70-71).
- Limnæa stagnalis**, L.—Killany (70). Grange (71). Ardee (81). Beaulieu (92). Not common.
- L. auricularia**, L.—Near Blackhall (82). Beaulieu (92). Rare.
- L. peregra**, Müll.—Killany; Dundalk (70). Lough Aumore; Omeath; Grange (71). Ardee (81). Annagassan; Barmeath; Blackhall (82). Townley Hall (91). Beaulieu (92). Common everywhere.
- L. palustris**, Müll.—East of Inniskeen; Dundalk (70). Carlingford (71). Ardee; Collon (81). Annagassan; Barmeath; Lough Drumshallon (82). Townley Hall (91). Drogheda (92). Rather common.
- L. truncatula**, Müll.—Dundalk; Blackrock (70). Carlingford (71). Ardee; Collon (81). Annagassan; Clogher; Lough Drumshallon (82). Townley Hall (91). Beaulieu (92). Common.
- Physa fontinalis**, L.—Killany (70). Dundalk (70-71). Darver; Ardee (81). Annagassan (82). Beaulieu (92). Common.
- Aplexa hypnorum**, L.—Dundalk (70-71). Carlingford (71). Ardee (81). Near Blackhall (82). Not common.
- Planorbis marginatus**, Drap.—Killany; Dundalk (70). Lough Aumore (71). Ardee (81). Blackhall (82). Near Drogheda (91). Beaulieu (92). Fairly common.
- P. carinatus**, Müll.—Rathescar (81). Annagassan (82). Near Townley Hall (91). Rather rare.
- P. vortex**, L.—Killany (70). Very rare.
- P. spirorbis**, L.—Killany; Dundalk; Blackrock (70). Lough Aumore; Carlingford (70). Ardee (81). Blackhall (82). North of Townley Hall (91). Fairly common.
- P. contortus**, L.—Killany; Dundalk (70). Near Bush station (71). Darver; Collon (81). Salterstown; Blackhall (82). Beaulieu (92). Common.
- P. albus**, Müll.—Lough Ballybony; Ardee; Collon (81). Not common.
- P. glaber**, Jeffr.—Ballymascanlon (71). Quarry-hole near Townley Hall (91). Beaulieu (92). Very local, but plentiful where found.
- P. crista**, L.—East of Inniskeen; Lough Cortail; Dundalk (70). Lough Aumore; Omeath (71). North of Ardee; Collon (81). Salterstown; Barmeath; Dunleer (82). Beaulieu (92). Frequent.
- P. fontanus**, Lightf.—Near Blackrock (70). Lough Aumore (71). Collon; Rathescar (81). Beaulieu (92). Fairly common.
- Ancylus fluviatilis**, Müll.—Dundalk (70). Carlingford (71). Ardee (81). Townley Hall (91). Not uncommon.

- Ancylus lacustris**, L.—Lough Ballybony (81). Barmeath; Lough Drumshallon (82). Beaulieu (92). Not common.
- Acme ilneata**, Drap.—East of Inniskeen; Flurry Bridge (70). Omeath (71). Collon (81). Barmeath (type and var. *alba*) (82). Townley Hall (91). Beaulieu (92). Very plentiful at Townley Hall. Fairly numerous near Omeath, taken in moss on the north side of Ballyoonan mountain, where it was quite exposed; no trees or shelter of any kind growing.
- Bythinia tentaculata**, L.—Killany; Dundalk (70). Ballymascanlon (71). Ardee; Darver (81). Annagassan; Blackhall (82); Drogheda (91). Beaulieu (92). Very common.
- Hydrobia ulvæ**, Penn.—Dundalk (70-71). Carlingford (71).
- H. Jenkinsi**, Smith.—Dundalk (70). Carlingford (71). Drogheda (91). Baltray (92). Very plentiful in suitable situations.
- Valvata piscinalis**, Müll.—Killany; Dundalk (70); Darver; Collon; Rathescar (81). Annagassan (82). Beaulieu (92). Common.
- V. cristata**, Müll.—Dundalk (70). Ballymascanlon (71). Darver; Ardee; Collon (81). Barmeath; Blackhall (82). Drogheda (91). Beaulieu (92). Fairly common.
- Sphaerium corneum**, L.—Dundalk (70). Grange (71). Darver; Ardee; Collon (81). Annagassan; Blackhall (82). Beaulieu (92). Common.
- S. lacustre**, Müll.—Killany; Dundalk (70). Grange (71). Ardee (81). Togher; Blackhall (82). Beaulieu (92). Fairly common.
- Pisidium amnicum**, Müll.—Fane Valley (70). Ardee (81). Common in some rivers.
- P. nitidum**, Jenyns.—Omeath; Carlingford (71). Ardee (81). Salterstown (82). Not common.
- P. fontinale**, C. Pfr.—Dundalk; Lough Cortail (70). Carlingford; Grange (71). Ardee; Collon; Rathescar (81). Salterstown; Barmeath; Blackhall (82). Drogheda (91). Beaulieu (92). Common.
- P. milium**, Held.—East of Inniskeen; Lough Cortail; Dundalk (70). Carlingford; Grange (71). Ardee (81). Salterstown; Lough Drumshallon (82). Drogheda (91). Beaulieu (92). Common.
- P. obtusale**, C. Pfr.—Dundalk (70). Ardee (81). Blackhall (82). Not common.
- P. pusillum**, Gmel.—Dundalk (70). Carlingford (71). Ardee (81). Lough Drumshallon (82). N. of Townley Hall (91). Beaulieu (92). Fairly common.
- Unio margaritifer**, L.—Kilcurry River (70). Very plentiful in this river, and is also to be found in the Falmore river.
- Anodonta cygnea**, L.—Lough Corradoran (70). This shell is difficult to get; there are few natural lakes near the limestone area of Co. Louth, and the margins are too boggy to reach the edges. They are reputed to be in Lough Ballybony (81), but I could not get near the lake or obtain a specimen from it.

NOTES.

BOTANY.

The numbering of the Botanical County-Divisions of Ireland.

I need hardly say that the difficulty to which Mr. Waddell refers (*supra*, p. 197) was fully before me during the years in which I worked at the question of the botanical subdivision of Ireland. The more I studied the question, the more my mind recoiled from that totally unscientific and misleading numeration which, beginning in Cornwall and proceeding to Shetland, would pass thence without a break to South Kerry. The solution of the difficulty which occurred to me at the time, and which I would now suggest, is a very simple one; namely, to use a prefix (I) to the Irish numbers, which would distinguish them from corresponding English ones. The Britannic series would then run 1, 2, 3, . . . 112, I1, I2, I3 . . . I40. The series I1, I2, I3, . . . I40 is as easy and as short to write, print, or say as 113, 114, 115, . . . 152, so there exists no practical difficulty against its adoption; and I submit that scientifically it is infinitely preferable. Another point worthy of mention is this: that the numeration 1 . . . 40 for the Irish divisions having been adopted in a book that may fairly be called a standard work, the advantages of following the same system, unless it be so bad as to be untenable, are sufficiently obvious. I do not claim that the numeration which I adopted is perfect, but the absurdity of using one scheme for the Flowering Plants and Vascular Cryptogams, and a different one for those plants which follow next, would undoubtedly strike a bystander. Whatever plan Mr. Waddell adopts, I cannot think that his suggestion of accepting the forty divisions of "Irish Topographical Botany," and numbering them 113 to 152, will meet with approval. This would be hopelessly confused with Babington's scheme, in which a different set of divisions is numbered 113 to 149, and with that adopted by English conchologists, in which a still different series is numbered 113 to 148. Both of the latter schemes have been recently used in important books or papers, and must be regarded as *in esse*.

The whole question of a satisfactory scheme is hedged round with difficulty, but it seems to me that the latest suggested improvement will only make confusion worse confounded. I also, like Mr. Waddell, would ask the opinions of others.

R. LLOYD PRAEGER.

Dublin.

Achill Island Plants.

Three days spent in Achill last July, though not specially devoted to botany, were productive of a few additions to the flora of the island, as listed by me last year (*Irish Nat.*, xiii., 278), and of new stations for some rarer plants. One of the additions is a really rare plant, namely,

Lycopodium inundatum, the previously known range of which in Ireland consisted of a few stations in West Cork, one in North Kerry, and two in West Galway. The species new to Achill are marked with an asterisk.

Cochlearia danica.—At the signal tower.

Hieracium anglicum.—On an inaccessible ledge on the Slieve More scarp, at about 1,500 feet. No doubt the plant noted by H. C. Hart under this name, and one of the four plants recorded from Achill which I did not find previously.

Arctostaphylos Uva-ursi.—Plentiful on the signal tower hill.

Salix herbacea.—Rocks at west end of Slieve More, about 1,500–1,700 feet.

**Ceterach officinarum*.—Plentiful on the wall surrounding the signal tower, elevation about 800 feet. A strangely isolated and exposed station for this fern. It was accompanied by *A. Adiantum-nigrum* and *A. Trichomanes*.

**Lastrea Oreopteris*.—One good clump in a ditch S.W. of Dugort. A very rare plant in West Mayo.

Isotes lacustris.—Abundant in Bunnafreva Lough East, with a vast quantity of *Lobelia Dortmanna*.

**Lycopodium inundatum*.—This, one of the rarest plants which Achill yields, was found at the place which of all others on the island has been most frequently visited by botanists, namely, Sraheens Lough, on the west shore of the lake.

R. LLOYD PRAEGER.

Plants of the Ben Bulbin District.

Epilobium angustifolium.—On Glenade cliffs the ordinary deep rose form is accompanied by a plant with red sepals and delicate pink petals, forming a really beautiful sight.

Euphrasia Salisburgensis.—This is abundant on both sides of Glenade, among the alpine plants. Here on the cliffs it grows more lax and less branched, with larger greener leaves, than the little bushy brown form of the limestone pavements. I have it also from Glencar and Annacoona, in Sligo, from which county it is hitherto unrecorded.

Ulmus montana.—Clearly native on limestone cliffs among *Taxus*, *Pyrus Aria*, &c., far from planted trees or woods, on the north side of Glenade. New to the Ben Bulbin district.

Agropyron caninum.—Also an addition to the Ben Bulbin flora; growing with the last. This grass seems particularly partial to dry limestone cliffs.

Equisetum hyemale.—By the Bonet River, near Lurganboy. This station helps to fill a large gap in its distribution, its only recorded Connaught stations being far south—in Clare and S.E. Galway.

A number of other plants, additions to the flora of Sligo or Leitrim, in themselves not rare species, will be duly mentioned in my next annual summary. The above were collected in August last.

R. LLOYD PRAEGER.

Dublin.

Dicranodontium longirostra at Holywood.

About a couple of years ago I found on the rotten stump of a tree on the hill above Holywood, Co. Down, a moss which I made out to be *Dicranodontium longirostra*, B. & S.; this naming has been confirmed by Mr. J. E. Bagnall, of Birmingham. I am not aware of the typical plant having been previously recorded for Ulster, but var. *alpinus* was found by Dr. Moore "on moist rocks at Cushendall" (*Proc. R. I. A.*, 1872). It is not at all a common moss, and its occurrence in Ulster is worthy of record.

J. HUNTER.

Edinburgh.

The Parsley Fern in Co. Wicklow.

Last autumn Mr. R. V. Dixon brought me some small fresh fronds of *Allosorus crispus*, which he and his son had found growing in a crevice in a boulder beside the stream that drains Lough Nahanagan. In view of the fact that this fern has not hitherto been recorded from any station outside the North of Ireland, I delayed publication of Mr. Dixon's interesting discovery until I had examined the locality. This was done on June 18. The fern was not refound, but my examination convinced me that no doubt can be entertained as to the plant being indigenous in this station. The habitat is a wild moor, 1,100-1,300 feet, far from any house or former reclamation. Along the stream *Polypodium Phegopteris* and *Saxifraga stellaris*, both of which I found in abundance on the cliffs overhanging Lough Nahanagan (1,400-1,700 feet), descend from their alpine habitat to mingle with the riverside vegetation, between the deserted mines and the lake. I have little doubt but that the Parsley Fern likewise has come down stream from some station higher up, more in keeping with the alpine proclivities which it usually displays in Ireland (though in Co. Antrim it descends to 300 feet). I searched portion of the cliffs over Lough Nahanagan with some care with this thought in mind, but *P. Phegopteris*, as stated above, and *Cystopteris fragilis*, were the only uncommon ferns seen. With them was *Rubus saxatilis*, of which the only Wicklow records appear to be those in "The Irish Flora," 1833. Unfortunately, unaware of its rarity, the discoverers of the Parsley Fern in Wicklow brought away with them the only plant they found.

R. LLOYD PRAEGER.

Dublin.

Orobanche rubra in Sligo.

At the end of June Mrs. Johnson found a specimen of *Orobanche rubra*, Smith, in the sandhills at Rosses Point. It was growing among the Bent at the end of the sandhills nearest to the golf links. As it was almost our last day we had not an opportunity of looking for more specimens. The Rev. Canon Lett kindly determined the plant for me.

W. F. JOHNSON.

Poyntzpass.

Epilobium alsinefolium in Co. Leitrim.

Since there is apparently no note of this plant's having been gathered in its only Irish station since its discovery by Messrs. Barrington and Vowell twenty-one years ago, a note of its distribution as seen last August may be of interest; especially since its quantity as now observed is considerably greater than the note of the finders (*Proc. R.I.A.* (2), iv. (Science), p. 505). would indicate—on which account I need not hesitate to specify the locality where it grows. The Report on the Flora of Ben Bulbin, &c., states "1,000 feet. Seen only in two places on the Glenade cliffs, both close to each other. In one locality there is a large bed of it, and it is scattered in patches along a small stream." I found it extending for half a mile along the low cliffs in the townlands of Crum-paun, Moneengaugagh, and Carrowduff. It may extend further eastward and westward, as my exploration of this part of the Glenade cliffs did not reach beyond these townlands. It occurs at frequent intervals along this scarp. At the eastern end it ascends a small stream (as described above), attaining an elevation of about 1,200 feet. Elsewhere it occurs in large colonies in dripping rocks, growing among the *Cochlearia alpina* and *Chrysosplenium oppositifolium* with which they are hung. It also follows the rills down their course over the talus, below the cliffs, and I found the plant browsed by cattle as low down as 700 feet. The Irish plant is a desideratum in most herbaria, and I shall be happy to send a specimen to any botanist who needs it for his collection.

R. LLOYD PRAEGER.

Dublin.

Matricaria discoidea in Co. Cork.

Early in August last I found this colonist, as we may now call it, by the roadside between Carrigrohane and Ballincollig; since then I have noticed it growing abundantly in a market field at Middleton, and freely on waste ground and roadsides at Little Island. Judging by the freedom with which it grows in these widely separated localities I have no doubt that it will be found in similar situations, if looked for, in other parts of the county.

This plant, though first noticed in Ireland as recently as 1894, is now known to be abundant in many parts of the country from north to south, but it can hardly have spread to all localities from one centre and it would be of much interest to trace its origin or manner of introduction in different districts.

In most of the places in which I have seen it I think it is probably a product of the miscellaneous collections of seeds and waste corn sold everywhere in recent years as poultry food; though at Limerick, where it seems at present confined, with many other aliens, to a disused quarry, it has most likely sprung from the sweepings of flour mills which are sometimes deposited there.

R. A. PHILLIPS.

Cork.

Dryas octopetala on Muckish.

Mrs. Leebody sends a specimen of *Dryas octopetala*, collected in August last by Miss Leebody on Muckish, Co. Donegal. The station is described as being on the south side of the mountain, about one quarter way up. As Muckish rises from ground some hundreds of feet in elevation, this signifies a height of probably about 1,000 feet. The new station furnishes a very interesting link between Slieve League (the only previous Donegal station, lying forty miles S.W.) and Benevenagh in Derry, forty-five miles to the eastward. The distribution of the plant on Muckish has not yet been worked out.

R. LLOYD PRAEGER.

Dublin.

IRISH SOCIETIES.**ROYAL ZOOLOGICAL SOCIETY.**

Recent gifts include a Civet from Dr. F. Hatch, a Crest-crowned Crane from the Rev. E. P. Low, a Gannet from Mr. A. W. Samuels, a Hawk from Mr. T. Marshall, and a pair of Swans from Mr. Blackwood Price.

The three Lion cubs born early in August are doing well; two of them are males and one a female. The three older cubs will shortly be on view in one of the outer cages. The young Lion "Conn" of the old Dublin strain is growing rapidly and developing a fine mane; he will be reserved by the Council. Two young Marmosets have been born in the Gardens; they attract much attention and interest from visitors.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 12.—EXCURSION TO BALLINDERRY.—A party numbering fifty-six drove to Lisburn, where the cathedral was examined under the guidance of Canon Pounden. Thence to Ballinderry, where the several churches were visited. Around Portmore Lough some natural history work was done, the most interesting ornithological item being a Great Crested Grebe with its brood. On the journey home the party were entertained by Mrs. Walkington at Oatlands.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 2.—A large party visited St. Anne's, Clontarf (by kind permission of Lord Ardilaun), and went through the very fine collection of hardy and greenhouse plants under the conductorship of W. F. Gunn. Mr. Campbell, head gardener, gave much useful information respecting the many rare plants.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
" " 6	Charlock Spraying.
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IS THE MINNOW A NATIVE OF IRELAND?

BY R. F. SCHARFF, PH.D., M.R.I.A.

It seems strange that there should be any doubt among naturalists as to whether the Minnow is really a native of Ireland, or whether it has been introduced by man within recent times. Thompson¹, who collected information on almost every Irish species of animal with extraordinary perseverance and industry, could only ascertain the occurrence of the Minnow in the Counties of Dublin and Wicklow. But even there, doubts were entertained at the time that the Minnow was a true native. Professor Kinahan², for instance, wrote in 1854 that the Minnow swarmed in the Dodder in certain parts, yet he believed that it and the Gudgeon had been introduced from the Swords River about twenty years before. We have his admission, therefore, that about the year 1830 the Minnow inhabited the small stream near Swords, which is quite unconnected by canal with any other river system, and to which, unaided by man, it could not have spread. Besides these two streams it is also known in Co. Dublin from the Tolka. From the Dodder and the Tolka the Minnow certainly had an opportunity during the last hundred years, or, at least, since the opening of the Grand and Royal Canals, of spreading throughout a large portion of the plain of Ireland. Yet it seems to occur also in districts quite unconnected with our canal system.

Thompson states (p. 139) having heard from Dr. Robert Ball in 1846 that Minnow were common in Lough Dan (Co. Wicklow), and that a fisherman had assured the latter that they were as plentiful twenty-five years previously as they were then.

¹ "Natural History of Ireland," vol. iv., 1856, p. 138.

² *Proc. Dublin Nat. Hist. Soc.*, vol. i., p. 131.

No further efforts were apparently made in Thompson's time to settle the question as to the claims of the Minnow to be considered a native or an alien. And if it was difficult to solve the problem at that time, it is even more so now. I do not pretend to be able to do so; but it occurred to me that this might be an opportune moment to ascertain, as far as we can, the range of the Minnow in Ireland at the present time. It is probable also that such an inquiry might elicit information from correspondents of a nature that might throw light on the subject of the origin of the Minnow in Ireland. At any rate it is of interest, from time to time, to take stock of the various members of our fauna, especially of those which are known to have a local distribution. If a species has been introduced, and we know certainly that the Minnow has been liberated in several Irish streams, the history of such introductions might, as far as possible, be recorded for future reference.

I have only recently heard from Mr. Richard Carey, of Skibbereen, who has fished most of the rivers in County Cork, that he has not met with the Minnow in any of them. Yet, according to Mr. R. P. Williams¹, Dr. Herrick, of Mallow, placed dozens in 1848 in a stream at Rathpeacon, near Cork, and also in the Blarney River. Mr. Carey heard that Minnows did occur in the Awbeg River, near Doneraile, County Cork, but he believed they had been introduced by Mr. Lefanu. The latter gentleman is also credited by Mr. Carey with having introduced the Minnow into the River Loobagh, which runs through Kilmallock, in the County Limerick.

Mr. G. W. Forsyth, of Cappagh, County Waterford, informs me that Minnows are absent from the County Waterford. He believes, however, that they occur near Templemore. This would probably be in the River Suir, in which case they must turn up before long in the County Waterford.

From the whole west coast of Ireland I have but a single record, Mr. J. N. Halbert having noticed the Minnow near Derryclare Lake, in Galway. Mr. Halbert kindly elicited further information on the subject from Mr. H. H. N. Wheeler, of Galway, whose knowledge of fishery matters enables him to

¹ *Proc. Dublin Nat. Hist. Soc.*, vol i, p. 119.

speak with authority on the fishes of the district. He writes that he believes the Minnow to be an introduced species, since it seems to be only found in streams convenient to trout rivers or lakes. He further states that it is common in a stream near Oughterard, and that it is used by the Corrib fishermen when trolling for Trout. According to Mr. Wheeler, the Minnow was put into this river by Dudley Persse about thirty-seven years ago. At the same time he admits that two attempts to introduce the species into a small stream at Salt-hill near Galway city, failed, probably owing to the water being too shallow.

In 1892 a specimen of the Minnow was sent to the National Museum by the Rev. A. H. Delap, of Strabane. He tells me that this fish is common in the Mourne River, County Tyrone, close to Strabane, but that he remembers having heard from the Duke of Abercorn that Minnows were formerly put into the lake at Baron's Court, which communicates with the Mourne River. They may possibly have spread down stream in this manner.

Twenty years ago Mr. J. D. Ogilby¹, a distinguished Irish zoologist, wrote that nowhere had he seen Minnows in greater abundance than in the River Maine and in the Kells Water in County Antrim, and that he considered the theory of its introduction as excessively doubtful.

That Minnows also occur in many other rivers in the County Antrim is probable. At any rate Mr. Barney Meenan, of Muckamore, forwarded me some splendid specimens from the Six-mile Water, and states that Minnows have been in the river as long as the people of the district can remember, and that they also occur in the River Maine and on the Lower Bann. All these river systems communicate with Lough Neagh.

Going further south along the east coast into the Counties of Meath and Louth, the Minnow turns up again. It was in 1879 that an old member of Dublin Museum staff, Mr. John Boshell, discovered it in the Corkey River in Co. Louth, and brought specimens to the Museum. And later on in 1888 some were deposited in the Museum by Mr. James Duffy, another member of our staff, who took them in Lake Mentrim

¹ *Proc. R. Dublin Soc.*, vol. iv. (N.S.) 1885, p. 531.

in the County Meath. Both of these waters communicate with the River Dee. On asking Admiral Singleton, of Ardee, Co. Meath, for further information, he assured me that Minnows also inhabited the River Dee, but he believed them to have been introduced by Mr. Fitzherbert, of Navan. When I applied to the latter, he wrote that about 40 or 45 years ago he transported a number of Minnows and Gudgeon to Shantonagh, in the County Monaghan. He changed the water in the can containing the fish on his arrival at the River Dee, when some escaped, but he could not say whether the same species had already been an inhabitant of that river at the time. The remainder were placed into the stream at Shantonagh which runs into Lough Erne, but no Minnows have since been seen there.

There are two other small streams from which we possess specimens of Minnow in the National Museum. In 1896 Mr. Edward Williams found it in a brook at Loughlinstown, in the County Dublin, which is not, as far as I am aware, fished for trout. Finally in 1894 I obtained specimens in the Bray River, in the County Wicklow. Mr. Holt, of the Fisheries Branch (Dept. of Agriculture and Technical Instruction) informs me that the Minnow also inhabits the River Slaney near Wexford.

It will be noticed from the above that in a number of instances the presence of the Minnow in Irish lakes and rivers is attributed to introduction by man, though precise information is not always obtainable. On the other hand we possess several definite records of introductions which have been unsuccessful and have failed to establish the species where it did not previously exist. This clearly shows that the introduction of a species into a new area is not by any means so easy as it is generally held to be the case, which makes me inclined to believe that the Minnow is really indigenous in Ireland, at least in some of the eastern counties.

THE FLORA OF THE MULLET AND INISHKEA.

BY R. LLOYD PRAEGER.

RAILWAY extension has brought most of the remoter parts of Ireland within easy reach of the scientific traveller and unscientific tripper, but the wild mountain district of Erris, and storm-swept peninsula of the Mullet, still maintain much of their ancient isolation

Forty miles of road, running for the most part through bog and heath untouched by the hand of man, still separate Belmullet, the tiny town which is the capital of a barony of nearly 400 square miles, from the nearest railway station.

This almost treeless and fenceless district is interesting to the botanist chiefly from its being the head-quarters of *Erica mediterranea*, the beautiful Iberian-Irish heath. As Dr. David Moore wrote:—"To find a district of at least a quarter of a million of acres in extent covered with this lovely heath, in full bloom, during the second week in April, forms perhaps the most remarkable botanical feature the British Islands can afford." Apart from this, a high interest attaches to the flora of an area so primitive and undisturbed by human industry, especially when situated on the extreme edge of the Eurasian continent. This view was evidently taken by A. G. More when he wrote to S. A. Stewart in 1883:—"Erris in Belmullet, the Mullet, and Binghamstown, and round the large lake Garrowmore, is a promising district . . . If you prefer to leave your own ground, I should say take either Belmullet and Erris, including the Mullet; or the north of Limerick . . . Either of these two districts, viz. :—N. Limerick and N. Kerry, or Erris and Belmullet, would be well worth attention."¹

Up to the present our knowledge of Erris botany has been scanty. The only portion of the district that can be said to have been botanically examined at all is the peaks of the Nephin Beg range, which rise along the south-eastern boundary of the barony. These have received attention from Dr. Moore, from H. C. Hart, and from N. Colgan and Bishop D'Arcy, and their alpine flora is now well known.

¹ "Life and Letters" of A. G. More, p. 301.

The first traveller in Erris who published any account of its plants was Prof. Babington,¹ who visited this remote tract in July, 1836. Babington entered Erris by way of the grand pass that lies between Nephin and Birreencorragh; thence down the Owenmore valley, past Carrowmore Lake to Belmullet. To the Mullet he devoted two days, and traversed it from end to end. His botanical notes are not copious. Some forty Erris species are mentioned, many of them as found on the Mullet. The majority are plants common throughout Ireland; but two, though now known to be widely distributed, were then noted for the first time in this country—namely *Callitriche pedunculata* and *Myosotis repens*. No mention is made of *Erica mediterranea* or any other of the western species, unless *Osmunda regalis* be so classed.

In April, 1852, Dr. David Moore made a pilgrimage to Erris, his object being to see the Mediterranean Heath in its Mayo stations, and to secure plants for cultivation. The season was too early for general botanizing, and *Erica mediterranea* is the only Erris plant noted in his paper,² which was read before the Royal Dublin Society immediately after his return.

A few years later (in July, 1859), Dr. Moore was again in Erris.³ He travelled "partly on foot and partly by car" from Ballina to Bangor in the Owenmore valley, where he established his head-quarters, and thence "made excursions in every direction." He collected a good many plants on the Nephin Beg range, and made further enquiries into the range of *Erica mediterranea*, the principal object of his visit being to obtain plants of the dwarf dark-flowered form of that plant.

¹ On the Botany of Erris, County Mayo, and a notice of several additions to the Flora Hibernica. *Mag. of Zool. and Bot.*, ii., pp. 119-124, 1837. Also "Memorials, Journal, and botanical correspondence of Charles Cardale Babington," pp. 52-54. 1897.

² On the Distribution of the *Erica mediterranea*, var. *Hibernica*, and some other Plants, in Ireland. *Phytol.*, iv., 597-599. 1852.

³ Observations on the prevailing and rare plants of Erris, and of some other portions of the County of Mayo. *Nat. Hist. Review*, vii., Proc., pp. 414-417. 1860.

Mr. More was frequently in Erris in the seventies, but was chiefly engaged in dredging and shooting, and the time spent on shore was short.¹ The only trace of his visits that the botanical records afford is a note of *Juncus obtusiflorus*, from sands near Belmullet (*Cybele*, ed. ii.)

A record in *Cybele*, ed. ii. of *Erica mediterranea* from near Belmullet in the name of H. C. Hart, dated 1887, leads one to conclude that that botanist penetrated to this, as to most other remote corners of our island, but this note appears to be his sole published observation from western Erris.

My own only previous experience of Erris rests on a brief scamper over the bleak hills which fringe Broad Haven at 4 o'clock on a June morning in 1896, till the horn of the "Granuaile" summoned us aboard again. On that occasion I met with no plant of interest.

Of the flora of the several islands lying off the Erris coast, not as much as a single note appears to have been published; and indeed, the ill-fated visit of A. G. More to Inishkea in 1873 is the only record we have of a botanist having landed on these remote islands.

Last July my wife and I sailed from Achill to Inishkea, and spent a day and a half in exploring the north and south islands; thence to Belmullet, where five days were spent on the Mullet and one about Carrowmore Lake; and thence by steamer along the grand cliff scenery of north Mayo to Sligo. In the present paper I shall endeavour to sketch the botany of the Mullet and Inishkea.

THE MULLET.

The Mullet is an almost insular area, Broad Haven on the north, and Blacksod Bay on the south, approaching each other to within 300 yards at the town of Belmullet. Through the intervening neck a sea canal has been cut. The area, embracing about 45 square miles, thus isolated, divides itself into two parts of different physical aspect. The portion south of Belmullet consists of a long narrow promontory, some ten miles in length by one to two miles in width, of low elevation save in the extreme south, where a group of bare hills rise to

¹ More's "Life and Letters," chaps. 34-36. 1898.

between 300 and 400 feet. The outer coast of this area is occupied by great stretches of sand-dunes, with occasional low projections of rock covered with stony drift. The eastern side, on the other hand, facing Blacksod Bay, is largely occupied by poor pasture and tillage. Bog vegetation is absent, though peat is dug from below the farmed surface; and heath is represented only by a miserably starved flora. Trees are absent save for a few dwarfed Sycamores, &c., beside a couple of houses. A single small bush of *Salix cinerea* and one of *S. aurita* were seen in sheltered nooks at opposite ends of the Mullet. Otherwise gorse and brambles in small quantity are the only native shrubs, save a few low-growing forms like *Salix repens*. Several shallow lakes occupy depressions on this part of the peninsula.

In the broader northern end of the Mullet, on the other hand, the ground is higher, the sands give way to rocks and cliffs, and cultivation to wind-shorn moorland, over a considerable depth of peat; and though the greatest elevation is only 434 feet, the flora takes on a mountain character. As one proceeds northward towards Erris Head bare moorland, bounded by sea-cliffs, comes to occupy the whole scene.

The rocks of the district consist wholly of gneiss, mica schist, quartzite, and granite. The granite is confined to the southern end of the Mullet, where it rises into several low hills. Quartzite occurs at the north end of the Mullet, between Erris Head and Broad Haven. The remainder of the area, including Inishkea, is almost entirely gneiss, half smothered, in the part south of Belmullet, under blown sand, and in the part north of Belmullet, under peat bog.

The Cultivated Area.

The most conspicuous feature of the flora of the ground affected by human operations—fields, banks, and roadsides—is the replacement of mesophile by hydrophile species. Thus *Senecio aquaticus* brightens the pastures instead of *S. Jacobæa*; the Purple Loosestrife is everywhere; and no dry bank is too dry for *Hydrocotyle* and *Anagallis tenella*.

Fields of hay are sometimes filled with *Heracleum* and *Daucus*. The tillage is mostly occupied by potatoes and oats,

with some turnips, barley, and rye. Here *Chrysanthemum segetum* and *Brassica campestris* are conspicuous; *B. Sinapis* being quite rare. Of Dead-Nettles, *L. intermedium* is frequent, *L. purpureum* rare, with *Stachys arvensis*. Fumitories are rare, *F. officinalis* and *F. capreolata* being each once seen, the latter as grand plants up to five feet long, approaching *F. speciosa*. The Brambles which shelter on the lee side of the ditches are not abundant, but display a fair variety. There is a difficulty in obtaining satisfactory material for determination. Mr. Rogers names six forms, of which *R. corylifolius* is new to West Mayo. The balance includes the endemic *R. iricus*, and also *R. dunnoniensis*, which is rare in Ireland. Were it not for the shelter afforded by ditches and loose stone walls, Brambles would possibly not exist on the peninsula. The roadside flora is very limited; *Senebiera Coronopus* is abundant in such places, while *S. didyma* was seen near Belmullet. Very few of the plants which haunt the vicinity of houses are present. A few plants of typical *Rumex sanguineus*, found close to Binghamstown Castle, had probably an extraneous origin. Burdocks are frequent. In view of recent experiments in the cultivation of these plants, Mr. Bennett hesitates to apply positive names to them, but a plant which would be generally called *A. intermedium* Lange is frequent, while *A. Newbouldii* was gathered near Cross Lough. *Ulex europaeus* is the only plant with which any attempt is made to form hedges; but the gorse is in some places clearly native.

Salt Marsh and Sea Rock.

Salt marsh is but poorly developed on the Mullet, but the upper part of the Portnafranka inlet consists really of a brackish lake, filling at high water through a narrow drainage channel, and yielding a fair halophile flora. Here alone were observed *Ænanthe Lachenalii* and *Scirpus rufus*; also *Potamogeton interruptus*, either the type or *P. vaginatus*. This Portnafranka lake is only slightly brackish, however, and *Bidens cernua*, *Utricularia intermedia*, and *Chara aspera* (var. *subinermis*) may be seen growing amicably with *Triglochin maritimum*, *Scirpus maritimus*, and the other halophiles

mentioned above. *Ruppia rostellata* occurs, in addition to brackish pools in several places, over a large area of tidal sands on the Portnafranka inlet.

Spergularia rupestris, *Crithmum*, *Beta*, *Carex extensa*, and *Asplenium marinum* are concentrated on rocks at the northern and southern extremities of the peninsula. A few non-maritime plants find on the northern seacliffs their sole refuge ; such are the Ivy and Honeysuckle ; and on the same seacliffs in the north, *Sedum Rhodiola* has its home, and in some spots forms a very conspicuous feature.

The Dunes

The area occupied by blown sand is very extensive, and the dunes are large, the highest of them rising to 188 feet above O.S. datum. On the sandy beaches, in addition to Oraches, the only plants are *Arenaria peploides*, *Agropyron junceum*, *Salsola Kali*, and *Polygonum Raii*. On the dunes, the seaward part is in many places being denuded, and vegetation is almost nil. Behind that lie the high dunes, with *Psamma* in undisputed sway. Further inland, a close mossy vegetation comes in, with enormous quantities of *Galium verum*, *Thymus Serpyllum*, and *Salix repens* ; and often behind that again lies low smooth ground of damper sand, with a flora characterized by *Sagina nodosa*, *Parnassia*, *Pinguicula vulgaris*, and *Selaginella*. *Eryngium maritimum*, which grows abundantly and very luxuriantly on the dunes, extends over all these belts except the last, and may be found more than a quarter of a mile from the sea margin. *Heracleum* often occurs in remarkable abundance. *Senecio Jacobaea*, which over the rest of the Mullet is usually replaced by *S. aquaticus*, is abundant on the dunes, var. *flosculosus* being as abundant as the type, accompanied by every intermediate stage. *Campanula rotundifolia* is present in charming profusion, with quantities of *Cerastium tetrandrum*, *Leontodon hirtus*, and *Koeleria cristata*. *Phleum arvenarium* is frequent ; and also *Festuca rottbællioides*, especially on stony sands. The extensive dunes west of Belmullet formed the only habitat noted for *Arabis hirsuta* (a rare plant in West Mayo), *Gentiana Amarella*, and *G. campestris*, and the curious var. *littoralis* Parnell of *Catabrosa aquatica* ; while the

dunes near Binghamstown Castle yielded a profusion of *Viola tricolor*, and also the sole station of *Vicia sepium*, in a dwarf form six inches high and almost devoid of tendrils, with handsome rose-purple flowers, forming patches many yards in area among the Bent. On the sands at Cross Lough a glabrous form of *Cerastium triviale*, with dark green shining foliage, was present.

The Lakes.

Although the several lakelets on the Mullet present similar physical conditions, their flora varies considerably. Ardmore Lough, lying on the Blacksod side, occupies a very flat depression, which at the time of our visit was quite dry, and presented a plain of red sand, largely covered with a green mantle of *Littorella*. The sward was thickly strewn over its entire area with the graceful flower-stems of *Lobelia Dortmanna*, and more sparingly with those of *Eriocaulon septangulare*. *Juncus supinus* and *Eleocharis multicaulis* made up the bulk of the other plants present. Cross Lough, the largest sheet of water on the Mullet, covering some 250 acres, is formed by the damming back of drainage by the dunes of the western shore. It also is extremely shallow, with a flat bottom of hard sand, and slightly brackish water of yellowish colour. Here the bottom is covered with *Chara aspera* (subsp. *desmacantha*), and *Littorella*. *Potamogeton pectinatus* is common, and with it are two rarer species, *P. prælongus* and *P. filiformis*. *Ranunculus trichophyllus*, *R. Baudotii* (both new to W. Mayo), and *Myriophyllum spicatum*, make up the total of hydrophytes. A ditch south of the lake forms the only station for *Chara vulgaris* (type and var. *longibracteata*). Leam Lough, where I hoped to get some additional plants, turned out to be salt; it fills by means of its drainage channel at spring tides. Its shores have a halophile vegetation, and its waters contain only a few algæ. But the furthest lake on the Mullet—a mere sandy pond lying behind the dunes at Newtown—proved unexpectedly interesting. It is choked with *Ceratophyllum demersum*, *Potamogeton prælongus*, *Chara hispida*, and *C. aspera*, along with which are *Ranunculus Baudotii* and *Mynophyllum spicatum*. Of these, the Hornwort is the most

interesting. Its nearest stations lie in Clare, Westmeath, and Londonderry, and it was strange to find it in so remote and isolated a scrap of water. Two small lakes lying on the moorland three miles north of Belmullet proved to be ordinary bog-lakes, with a flora chiefly of *Lobelia* and *Juncus supinus*.

Heath, Bog, and Marsh.

Although when well developed, the heath, bog, and marsh vegetations are sufficiently distinct, yet in these western areas they fuse to a large extent, both heath and marsh so frequently tend to boggyness. On the low hills that terminate the Mullet on the southward, a stunted grassy heath is developed. Here *Habenaria conopsea* has its only station, and among the other plants are *H. viridis* and *Ophioglossum*, each found elsewhere in only one spot. On the hill-tops at the north end of the Mullet, and along the cliffs to Erris Head, there is a large extent of wind-shorn heath, the carpet being formed of *Erica cinerea*, *Calluna*, *Arctostaphylos*, *Uva-ursi*, and *Empetrum*, with sometimes a small admixture of *Juniperus nana*.

Here in the north, peat bogs are well developed, but, excepting *Drosera anglica*, no plant peculiar to them was noted. Elsewhere, shallow bog, marshy spots, and wet sandy areas are intermixed, and their flora is to a great extent similar. Characteristic and abundant species are *Radiola linoides*, *Hypericum clodes*, *Peplis Portula*, *Gnaphalium uliginosum*, *Cnicus pratensis*, *Myosotis repens* (first recorded for Ireland from the Mullet by Babington, and here replacing *M. palustris*), *Veronica Anagallis*, *Hydrocotyle vulgaris*, *Anagallis tenella*, *Eleocharis multicaulis*. *Drosera anglica* was seen only on the northern bogs; *D. intermedia* is widespread, like *Pinguicula lusitanica*. *Sium angustifolium* has its head-quarters about Cross Lough and Leam Lough, like *Lotus uliginosus*, *Bidens tripartita*, and *Lysimachia vulgaris*. *Epipactis palustris* favours the sandy marshes and is frequent therein; *Juncus obtusiflorus* forms several large colonies on similar ground by the roadside between Belmullet and Binghamstown, no doubt the station observed by A. G. More. *Erica mediterranea*, poor and stunted, haunts the tract west of Belmullet, between the

northern hill-bogs and the sands and tillage which extend southward. The rare little *Centunculus minimus* was frequently seen, and often rewarded a search among the *Radiola* that was so constant a feature of the road edges. *Anthemis nobilis* occupied its usual habitat on sandy road edges in the north. *Sedum anglicum* characterized dry peat fences, like *Potentilla procumbens*, while *S. acre* was confined to sea sands. In the shelter of the rude fences, two western ferns, *Osmunda* and *Lastræa æmula*, were conspicuous. The viviparous form of *Festuca ovina*, usually found on mountains, occurred on dry heath near sea-level at the extreme south of the Mullet.

INISHKEA.

Inishkea consists of two islands, North and South, separated by a very narrow channel. Each is of irregular shape; the north island has an area of 464 acres, the south of 344 acres. They lie off the Mullet at a distance of two to three miles. Their position, rising as they do from the open Atlantic, is exposed to a desperate degree, and they are absolutely bare and wind-swept—in part sea-swept, in fact, since during winter gales the waves pour across the islands in a number of places. The north island is a mere ridge of gneiss, half smothered under drifting sand. It rises to over 100 feet on the western edge, which is carved into wild cliffs and deep gullies. So great is the force of the waves here that this highest point is actually the crest of a storm beach of huge fragments of rock. Thence the ground slopes eastward, and the eastern part of the island is all sand. South Inishkea is higher, rising in the centre into a conspicuous rounded hill (Knocknaskea), 230 feet high, crowned with a stone beacon; while the southern part forms a ridge over 100 feet high, sloping as usual from west to east, and almost cut through by the ocean in several places. Trees are entirely absent, and the largest shrubs seen were a few prostrate brambles spreading over a sheltered nook on the shore.

Each island has on the eastern shore a little sandy bay, around which are clustered the cottages of the islanders, who number 289 (1901 census), distributed almost equally between

the two islands. The cultivated ground is in each case confined to a few sheltered slopes and depressions. The salinity of the conditions is shown by the occurrence of *Cakile* as a weed in potato fields, of *Agropyron junceum* on cottage roofs, and of *Asplenium marinum* and *Spergularia rupestris* on old walls.

The extensive sands which form so conspicuous a feature of North Inishkea have only a sparse semi-covering of vegetation, consisting mainly of *Agropyron junceum* and *Potentilla Anserina*, dotted in places with curious dense bosses of *Armeria maritima*, which attain a diameter of two to three feet and a height of a foot and a half. As the ground rises, a close sand-sward is developed, consisting largely of *Galium verum*, *Achillæa Millefolium*, *Lotus corniculatus*, and *Plantago lanceolata*, with a curious stemless form of *Daucus Carota*, bearing a single terminal umbel close set among the little rosette of root leaves. On the western or ocean side *Plantago* sward of the type described by me from Clare Island and Achill Island, is a conspicuous formation, and yields, among other plants, the tiny unbranched var. *simplex* Duby of *Lcontodon autumnalis*. The 230 foot hill on South Inishkea allows of the presence of a stunted heath association. While its seaward face is in possession of *Plantago* sward almost to the summit, on the other sides *Calluna*, *Erica cinerea* and *E. Tetralix*, *Scabiosa succisa*, *Jasione*, *Triodia*, *Potentilla Tormentilla*, *Polygala serpyllacea*, *Viola Riviniana*, *Rumex Acetosella* find their only Inishkea habitat. On the north island are several tiny lakelets. Owing to exceptional drought these were all dry, but most of their flora still recognizable. The largest of these, the brackish Doon Lough, presented a surface of mud and weeds full of great eels, half of them dead in fantastic attitudes, half still writhing—a weird sight worthy of the Doré Dante. This lake yielded *Scirpus Tabernæmontani* and *S. maritimus*, as well as the hydrophytes found in the two other lakelets on the island—namely a batrachian *Ranunculus* (*R. Baudotii*), *Myriophyllum spicatum*, *Potamogeton pectinatus*, *Chara fragilis*, and *C. hispida*. The cultivated land is, on the north island, mostly sandy, on the south mostly peaty. Potatoes are almost the only crop grown, but a little rye, barley, and turnips may be also seen. The only native plant which is cultivated is *Salix viminalis*, of which a few

tiny beds may be noticed. The commonest plants of the tilled land are *Brassica campestris*, *Matricaria inodora*, and *Chenopodium album*. *Artemisia vulgaris*, *Polygonum aviculare*, *Potentilla Anserina*, and *Glaux maritima* also sometimes make themselves conspicuous. *Lamium intermedium* is the commonest of the three purple Dead-nettles, all of which occur. Fine plants of *Fumaria capreolata* were gathered on North Inishkea, and *F. confusa* (var. *hibernica*) grows on both islands. *Convolvulus arvensis*, a plant hitherto unrecorded for West Mayo, has formed an extensive colony on the north island, flowering in delightful profusion. The effect of the shelter afforded by the hill on the south island is seen in the increased weed flora of the tilled ground of its eastern slope. Here also occurred the only bramble of which sufficient material could be collected for positive naming—a form of *R. cæsius*, unknown to M. Rogers. But at least two other brambles grow on Inishkea. The sea cliffs of the western shores are mostly utterly wave-washed and almost devoid of vegetation, but in sheltered gullies *Spergularia rupestris*, *Crithmum*, *Angelica*, *Aster Tripolium*, *Beta*, and *Asplenium marinum* grow vigorously. One of the most remarkable plants of Inishkea is *Hyoscyamus niger*, the Henbane, hitherto unrecorded for West Mayo, which flourishes about the ancient inscribed cross which stands above the harbour on the south island. This plant is held in a kind of apprehensive veneration by the islanders, and vivid stories are told of its poisonous properties. It increases year by year, we were assured, till in the seventh season it grows up in great abundance and blossoms profusely. We were unable to discover when the next “seventh year” would be, but at the time of our visit, sure enough, only immature plants were present, though it was just flowering time.

LISTS AND ANALYSES.

In order to allow of comparison between the Inishkea flora and that of the Mullet, and between both and that of adjoining insular or mainland areas, I list first the Inishkea flora, and then supplement it by adding those plants of the Mullet which were not found on the islands.

Flora of Inishkea.

N.=North island; S.=South island; no suffix=both islands;
c.=conspicuously common (on both islands).

Ranunculus Baudotii.	Potentilla Tormentilla,	Cichorium Intybus, S.
Flammula, c.	S.	Hypochaeris radicata.
acris, S.	Anserina, c.	Leontodon autumnalis.
repens.	Sedum anglicum, S.	Taraxacum officinale.
Fumaria capreolata.	acre, N.	Sonchus oleraceus.
confusa (hibernica)	Hippuris vulgaris, N.	asper.
Nasturtium officinale.	Myriophyllum spica-	arvensis.
Cochlearia officinalis.	tum, N.	Jasione montana, S.
danica, N.	Callitriche stagnalis, S.	Calluna vulgaris, S.
Brassica campestris, c.	Lythrum Salicaria, S.	Erica Tetralix, S.
Sinapis, S.	Epilobium parviflorum,	cinerea, S.
Capsella Bursa-pastoris	S.	Armeria maritima, c.
Senebiera Coronopus,	Hydrocotyle vulgaris,	Glaux maritima, c.
c.	c.	Anagallis arvensis.
Cakile maritima, N.	Eryngium maritimum,	tenella, c.
Viola Riviniana, S.	S.	Samolus Valerandi.
Polygala serpyllacea, S.	Apium nodiflorum, c.	Erythræa Centaureum.
Silene maritima.	inundatum, S.	Myosotis caespitosa, S.
Cerastium tetrandrum,	Crithmum maritimum.	arvensis, S.
c.	Angelica sylvestris.	Convulvulus arvensis,
triviale.	Heracleum Sphondy-	N.
Stellaria media.	lium.	Hyoscyamus niger, S.
Arenaria serpyllifolia,	Daucus Carota.	Euphrasia officinalis, c.
N.	Galium verum.	Bartsia Odontites.
peploides.	Aparine, S.	Mentha hirsuta.
Sagina maritima.	Scabiosa succisa, S.	Thymus Serpyllum.
procumbens, c.	Solidago Virgaurea.	Prunella vulgaris.
nodosa, N.	Bellis perennis.	Stachys palustris, S.
Spergula arvensis, S.	Aster Tripolium.	arvensis, S.
Spergularia media, N.	Gnaphalium uligino-	Lamium intermedium.
salina, c.	sum, S.	purpureum.
rupestris.	Achillæa Millefolium.	hybridum.
Radiola linoides.	Ptarmica, S.	Plantago major.
Linum catharticum.	Matricaria inodora, c.	lanceolata, c.
Geranium molle, N.	Artemisia vulgaris.	maritima, c.
Erodium cicutarium.	Tussilago Farfara.	Coronopus, c.
Trifolium pratense.	Senecio vulgaris, c.	Littorella lacustris.
repens.	Jacobæa.	Chenopodium album,
Anthyllis Vulneraria.	aquaticus, c.	c.
Lotus corniculatus.	Arctium intermedium.	Beta maritima.
Vicia Cracca.	Cnicus lanceolatus.	Atriplex erecta, S.
Rubus caesius.	pratensis, S.	hastata, c.
	arvensis.	Babingtonii, S.

Salsola Kali, S.	Eleocharis palustris.	Koeleria cristata.
Polygonum Convolvulus.	multicaulis, N.	Dactylis glomerata, N.
aviculare.	Scirpus Savii.	Poa annua.
Raii, N.	Tabernæmontani,	pratensis.
Persicaria.	N.	trivialis, S.
amphibium.	maritimus, N.	Glyceria fluitans, S.
Rumex obtusifolius.	Schænus nigricans.	maritima, N.
crispus.	Carex arenaria, N.	Festuca rottbœllioides,
Acetosa.	vulgaris, N.	c.
Acetosella, S.	glauc.	ovina, c.
Euphorbia Helioscopia	distan, N.	Bromus mollis, c.
Urtica dioica, N.	extensa.	Lolium perenne, S.
urens.	flava.	Agropyron repens.
Salix repens.	Alopecurus geniculatus	junceum.
Iris Pseud-acorus.	S.	Pteris aquilina, S.
Juncus bufonius.	Agrostis alba.	Asplenium marinum.
Gerardi.	vulgaris, S.	Polypodium vulgare,
supinus, S.	Psamma arenaria.	S.
lamprocarpus.	Aira præcox.	Osmunda regalis, S.
Alisma ranunculoides.	Holcus mollis, S.	Ophioglossum vulga-
Triglochin palustre.	lanatus, S.	tum, N.
maritimum, S.	Arrhenatherum elatius.	Equisetum arvense, N.
Potamogeton polygoni-	Triodia decumbens.	palustre, N.
folius, S.	Phragmites communis.	Chara fragilis, N.
pectinatus.	Cynosurus cristatus, S.	hispida, N.

Of the above, the few species which were not also seen on the Mullet form a somewhat mixed assemblage :—

Fumaria confusa.	Cichorium Intybus.	Lamium hybridum.
Cochlearia danica.	Convolvulus arvensis.	Atriplex Babingtonii.
Cakile maritima.	Hyoscyamus niger.	Chara fragilis.
Rubus cæsius.		

Of these, all but the second, third, fourth, and last two are probably introduced on Inishkea; and the others are probably not really absent from the adjoining mainland.

By now giving a list of Mullet plants not seen on Inishkea, the comparison between the two areas is brought out fully, and the list of the Mullet flora rendered complete.

Mullet Plants not seen on Inishkea.

Ranunculus tricho-	Caltha palustris.	Cardamine hirsuta.
phyllus.	Arabis hirsuta.	Sisymbrium officinale.
Fumaria officinalis.	Cardamine pratensis.	Senebiera didyma.

Raphanus Raphanis-	Valeriana sambucifolia.	Rumex sanguineus.
trum.	Eupatorium cannabi-	Myrica Gale.
Viola palustris.	num.	Salix cinerea.
tricolor.	Pulcaria dysenterica.	aurita.
Lychnis Flos-cuculi.	Bidens cernua.	Empetrum nigrum.
Cerastium glomeratum	tripartita.	Ceratophyllum demer-
Stellaria graminea.	Anthemis nobilis.	sum.
uliginosa.	Chrysanthemum Leu-	Juniperus nana.
Montia fontana.	canthemum.	Listera ovata.
Hypericum tetrap-	segetum.	Epipactis palustris.
terum.	Tanacetum vulgare.	Orchis incarnata.
pulchrum.	Senecio sylvaticus.	maculata.
elodes.	Arctium Newbouldii.	Habenaria conopsea.
Geranium dissectum.	Centaurea nigra.	viridis.
Ulex europæus.	Lapsana communis.	Narthecium ossifra-
Trifolium dubium.	Crepis virens.	gum.
Lotus uliginosus.	Hieracium Pilosella.	Juncus squarrosus.
Vicia sepium.	Leontodon hirtus.	effusus.
Lathyrus pratensis.	Lobelia Dortmanna.	maritimus.
Spirea Ulmaria.	Campanula rotundi-	obtusiflorus.
Rubus dumnoniensis.	folia.	acutiflorus.
pulcherrimus.	Arctostaph. Uvaursi.	Luzula erecta.
rusticanus.	Erica mediterranea.	Typha latifolia.
iricus.	Primula vulgaris.	Sparganium ramosum
pyramidalis.	Lysimachia vulgaris.	simplex.
corylifolius (cyclo-	Centunculus minimus.	Lemna minor.
phyllus).	Gentiana Amarella.	Potamogeton natans.
Potentilla procumbens.	campestris.	prælongus.
palustris.	Menyanthes trifoliata.	pusillus.
Rosa spinosissima.	Calystegia sepium.	interruptus.
Parnassia palustris.	Veronica Tournefortii.	filiformis.
Sedum Rhodiola.	arvensis.	Ruppia rostellata.
Drosera rotundifolia.	Chamædrys.	Zostera marina.
anglica.	Anagallis.	Eriocaulon septangu-
intermedia.	Beccabunga.	lare.
Callitriche hamulata.	Pedicularis palustris.	Scirpus pauciflorus.
Peplis Portula.	sylvatica.	cæspitosus.
Epilobium obscurum.	Rhinanthus Cristagalli.	fluitans.
palustre.	Utricularia minor.	setaceus.
Conium maculatum.	intermedia.	lacustris.
Sium erectum.	Pinguicula vulgaris.	rufus.
Ceanothe Lachenalii	lusitanica.	Eriophorum vagina-
crocata.	Galeopsis Tetrahit.	tum.
Hedera Helix.	Salicornia herbacea.	angustifolium.
Lonicera Periclyme-	Suaeda maritima.	Rhynchospora alba.
num.	Polygonum Hydro-	Carex pulicaris.
Galium saxatile.	piper.	paniculata.
palustre.	lapathifolium.	vulpina.

<i>Carex echinata.</i>	<i>Agrostis canina.</i>	<i>Lastrea Filix-mas.</i>
<i>ovalis.</i>	<i>Aira caryophyllea.</i>	<i>dilatata.</i>
<i>pilulifera.</i>	<i>Molinia cærulea.</i>	<i>Equisetum limosum.</i>
<i>præcox.</i>	<i>Catabrosa aquatica.</i>	<i>Lycopodium Selago.</i>
<i>panicea.</i>	<i>Festuca sciuroides.</i>	<i>Selaginella selagin-</i>
<i>binervis.</i>	<i>rubra.</i>	<i>oides.</i>
<i>Hornschuchiana.</i>	<i>Nardus stricta.</i>	<i>Chara aspera.</i>
<i>Anthoxanthum odor-</i>	<i>Blechnum Spicant.</i>	<i>vulgaris.</i>
<i>atum.</i>	<i>Athyrium Filix-fæ-</i>	
<i>Phleum arenarium.</i>	<i>mina.</i>	

Three plants, recorded from the Mullet, were not found by me. *Camelina sativa*, noted by Babington as frequent in flax fields in 1836, has disappeared along with the flax in which it was a denizen. *Senecio viscosus*, recorded by the same writer, appears to have been *S. sylvaticus*. Finally, *Geranium pyrenaicum*, noted by Dr. Moore as "near Belmullet, close to the town," may be there still, but was not met with. Its only other western stations are inland and on the limestone, and it may have been casual here.

The flora of Inishkea as enumerated above numbers 185 species and sub-species, according to *Irish Top. Bot.* standard. The additional plants of the Mullet number 165, and deducting from the sum of these two 10 Inishkea plants not seen on the Mullet, the total Mullet flora is seen to be 340, or 350 for the Mullet and Inishkea. The following brief comparison between three neighbouring isolated areas in West Mayo may be instructive:—

—	Mullet.	Achill.	Clare I.
Area, . . .	45 sq. m.	57 sq. m.	6½ sq. m.
Greatest height,	434 feet.	2,204 feet.	1,520 feet.
Flora, . . .	350	419	368

In this comparison, the extreme poverty of the Mullet flora is the striking feature. This must be attributed mainly to the absence of variety of conditions—to the monotonous repetition of blown sand, poor tillage, and bog; and more especially to the absence of mountains, which not only bring in a new group of plants, but provide a certain amount of broken ground and shelter.

It is not necessary to analyse the flora of the Mullet according to types of distribution, as the features of the Achill and Clare Island floras are repeated there. Of the Irish types, the Marginal is the only one largely represented; and the flora is strongly calcifuge.

Eight of the plants recorded in this paper are additions to the now well-worked flora of West Mayo :—

<i>Ranunculus trichophyllus.</i>	<i>Convolvulus arvensis</i>
<i>Baudotii.</i>	<i>Hyoscyamus niger.</i>
<i>Fumaria officinalis.</i>	<i>Ceratophyllum demersum.</i>
<i>Sium angustifolium.</i>	<i>Potamogeton interruptus.</i>

In conclusion, I wish to express my indebtedness to Messrs. Arthur Bennett, H. and J. Groves, E. S. Marshall, H. W. Pugsley, and W. Moyle Rogers, for kind assistance as regard certain critical plants.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Touracou from Mrs. Wilfred Davidson-Houston, a Rhesus Monkey and some Chipmunks from Miss Evans, a Marmoset from Mrs. Taaffe, two Cockateels and a Parrakeet from Mrs. Jackson. Two young Nubian Lions, the gift of His Majesty the King, have arrived, and form a valuable addition to the collection. Two Brown Lemurs, two Black Lemurs, two Slender Loris, three Ichneumons, two Chestnut-bellied Squirrels, and two Malabar Squirrels have been purchased.

BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 16.—GEOLOGICAL SECTION.—An excursion was made to Colin Glen. On arriving at the lower portion of the glen a visit was paid to several sections of the Rhætic and Liassic formations, which are very well exposed at the present time. Various specimens of Rhætic were picked up, containing a large number of fish scales, &c. The party then proceeded to the upper glen where there are several good exposures of Keuper marls, Liassic and Cretaceous rocks.

The following fossils were recorded :—Rhætic beds—fish teeth, scales, &c., *Avicula contorta*, *Modiola minima*, *Protocardium rhæticum*. Liassic :—*Ammonites Johnstonei*, *A. planorbis*, *Cardinia ovalis*, urchin spines. Cretaceous :—*Corax sulcata*, *Lamna appendiculata*, *Exogyra conica* var. *levigata*, *Exogyra columba*, *Rhychonella dimidiata* var. *convexa*, &c.

NOTES.

BOTANY.

The Numbering of the Botanical Divisions of Ireland.

In contributing a few words to the discussion which has been carried on under this heading in the September and October issues of the *Irish Naturalist*, I would first of all draw attention to the heading itself. It is decidedly misleading, since the real question at issue is not the numbering of the Botanical County Divisions of Ireland but the numbering of the Botanical County Divisions of the British Isles considered as forming a single botanical region. The numbering of the county-divisions of Ireland on a rational system is happily an accomplished fact. The scheme of division and the sequence of the numbers proposed by Mr. Praeger in this Journal in 1896, and used by him five years later in his *Irish Topographical Botany*, is now accepted by Irish botanists as quite adequate for the purpose in view. That purpose is to exhibit the distribution of Irish plants in Ireland in much fuller topographical detail than was admissible under the scheme of District Divisions adopted in *Cybele Hibernica*. A scheme accepted by Irish botanists as the best possible for their own island must of course stand, even should it fail to meet with the approval of British botanists, whose acquaintance with Irish botany and topography must be comparatively limited.

When Mr. Waddell (*supra* p. 197) says that Mr. Praeger made "a great mistake" in not making "his numbers run consecutively with those of Great Britain," he seems to me to overlook the primary purpose of the scheme of sub-division and numbering he finds fault with. When he proceeds farther on to say that "it would be useful if a Catalogue were issued of British Flowering Plants," he evidently means a Catalogue of the Flowering Plants of the British Isles, which is a very different thing. After all, Ireland is geographically no less than financially a "separate" entity from Great Britain, and there is little reason to suppose that the fashion of "thinking imperially" will ever become so ingrained with Irish botanists as to lead them to confound their own island with the more important island across the water.

The difficulty of devising a satisfactory scheme of numbering for the botanical divisions of Great Britain and Ireland, viewed together as a single botanical region, is a very real one, and is ably stated by Mr. Waddell. Indeed, I think it is overstated, since the plan of numbering suggested by Mr. Praeger (*supra* p. 220) for use, when it is desired to treat Ireland as a part of the botanical region of the British Isles, seems to me to offer an adequate solution. An even simpler one might be suggested. Let the numbers in the proposed Catalogue for the British Isles have the contraction *Br.* set in front of the series of numbers denoting the British distribution, and *Ir.* in front of those denoting the Irish distribution. By this plan it is possible at once to avoid all ambiguity, and to save the space which might be occupied by the

frequent repetition of the capital *I* before each of the Irish county numbers. In cases where it may be necessary to refer to one of the Irish county numbers separately, then the capital *I* may be prefixed to avoid confusion.

With Mr. Praeger's statement of the objections to Mr. Waddell's proposed scheme of numbering the Irish divisions from 113 to 152, as stated in last month's issue of this Journal, I fully concur. The proposed consecutive numbering for the British Isles from 1 to 152 has no doubt a specious air of simplicity and uniformity, but none the less is it essentially unscientific and misleading. Nor can any plea of necessity be urged in its favour, unless it be a necessity to reject a carefully thought out and already well accepted scheme of Irish county numbers simply because it is Irish.

What is of cardinal importance for Irish botanists—and, indeed, for Irish zoologists as well, since the day is not far distant when the county distribution of the various branches of our Irish fauna will be taken in hand—is this, that the accepted scheme of numbering and sub-division of the Irish vice-counties should continue to hold the field. The use, even in a British Isles Catalogue, of the numbers 113 to 152 for the Irish County Divisions would inevitably tend to weaken the hold of Mr. Praeger's scheme of numbering in Ireland itself, a scheme which so far from being ill advised, as Mr. Waddell considers it to be, is in my opinion the only really well considered scheme in existence.

N. COLGAN.

Sandycove, Co. Dublin.

The advantages of one common scheme for recording the range in Ireland of all living creatures, whether animals or plants, are too obvious to need advocacy. When such a scheme has been carefully thought out and published for the best-known of all our groups—the Seed-plants and Fern-plants—it seems to me only reasonable to accept and use it for our lists of other organisms. And I would venture to express a very earnest hope that in the forthcoming list of the Hepaticæ of the British Islands, Mr. Praeger's numbering of the County-divisions may be adopted, with the prefix "*I.*" to each number as suggested by him, or of "*Ir.*" to the series as suggested by Mr. Colgan. Of these alternatives the former seems to me preferable, because each number would then tell its own complete story.

Mr. Waddell's suggestion to adopt Mr. Praeger's divisions, numbering them 113-152, seems to me the worst possible solution of the difficulty. A series of numbers in which South Kerry follows Shetland is thoroughly unscientific, and Mr. Waddell's enumeration would clash hopelessly with the two schemes (Watson's and Taylor's) already put forward on this principle, with their numbers 113-149 and 113-148, respectively. If the authors of the projected Catalogue of Hepaticæ cannot accept Mr. Praeger's scheme, they had better adopt Watson's old scheme as it stands. But a mere Englishman fails to understand how there can be two opinions among Irish botanists on such a question.

GEO. H. CARPENTER.

A new Liverwort from Ireland

In the *Journal of Botany* for October, Mr. W. H. Pearson describes and figures a new species of *Plagiochila*, which he names *P. killarniensis*, which was discovered by him last June growing on a moss-covered stone close to Torc Cascade, Killarney.

Artemisia maritima—a new station for Co. Dublin.

In July last this rare species turned up quite unexpectedly in a new County Dublin station, at the shore end of the Cardy Rocks, about a mile north of Balbriggan, where it grows in some quantity on the top of a low reef hardly five feet above tide mark. I had passed within a stone's throw of this station fully half a dozen times while engaged in a botanical survey of the county without noticing the plant, and should have passed it again on this occasion had my eye not been caught by a single tall budding spike. The *Artemisia* is admirably protected from discovery by association here with a common lichen, closely resembling it both in colour and in stature.

N. COLGAN.

Sandycove, Co. Dublin.

ZOOLOGY.

Irish Fresh-water Sponges.

Dr. Hanitsch, in his paper on "The Freshwater Sponges of Ireland" (*Irish Nat.*, iv., 1895), noticed that *Euspongilla lacustris* had been found in Camlough River, Co. Armagh, and at Killakeen, Co. Cavan; and *Heteromeyenienia Ryderi* in Lough Doon, Co. Kerry. Since then, specimens of these sponges have been received at the Dublin Museum from various parts of the country.

Euspongilla lacustris has been found in the following localities:—Lough Neagh; Woodburn, Co. Antrim; Portarlinton; Lough Carrowbeg, Co. Mayo; and Lough Corrib. This sponge thus seems to be as widely distributed throughout the country as Dr. Hanitsch predicted. *Heteromeyenienia Ryderi* has been found in Lough Fagher, Co. Kerry (see *Irish Nat.*, viii., 1899, p. 217), and Loughs Fee and Ballynakill, Co. Galway.

JANE STEPHENS.

Dublin Museum.

Psithyrus campestris in Co. Carlow.

Referring to Mr. Halbert's note on the above (*supra*, pp. 198-9), I have taken this *Psithyrus* here in considerable numbers. I have also taken a few females of *P. vestalis*, which seems to be much less common here.

DENIS R. PACK-BERESFORD.

Fenagh House, Bagnalstown.

Curious Accident to a Sand Martin.

A few weeks ago, when poking about the rocks to the south of Donaghadee, I heard a fluttering as of some bird in difficulties. Following the sound I soon saw on a large rock, facing the sea at an angle of about seventy-five degrees, a bird caught in some way. Making my way to it, I put my hand on the bird, which turned out to be a Sand Martin. One of its feet, which by the way was deformed, and short of a toe, was caught under a limpet, by no means a large one, but all the efforts of the bird were of no avail to free itself, and without doubt it would have been drowned when the tide came in, had I not happened on the spot, forced the limpet off, and let the bird fly away.

HAMILTON McCLEERY.

Belfast.

Early Arrival of Eider Ducks.

On Saturday, 19th August, 1905, I saw at Cultra Point two ducks which, from their large size, heavy build, peculiar markings, and characteristic shape of bill and head, I am quite sure were Eider Ducks; and subsequent reference to the plate in Dresser confirmed my identification. On consulting that valuable and recent work "The Birds of Ireland," I find Mr. Ussher says—"The Eider Duck appears in Ireland only as a straggler on rare occasions, of which more than thirty records are extant. These come from all sides of the island, but most frequently from the north coast, especially Rathlin Island, where Eiders have been shot on several occasions. It is only surprising that they do not visit it more frequently, as the distance of Rathlin from Islay—where the species breeds and is seen in large flocks—is less than twenty miles. At Rathlin, Eider Ducks have been met with in April and May, and once in September; but the bird is not known to have occurred on the main Irish coast before November, the month in which it most frequently visits this country." Thus the above-noted occurrence in Belfast Lough on 19th August appears to constitute an unusually early record for Ireland. The only previous records from Belfast Lough are one shot off Greencastle in October, 1877, and two shot in February, 1890.

R. LLOYD PATTERSON.

Holywood, Co. Down.

Natterer's Bat in Co. Carlow.

I have to record the capture here, in August last, of a Natterer's Bat, kindly identified for me by Dr. Scharff. As this bat has only been recorded from about six different localities in Ireland its occurrence here is worth noting. I have also taken the Long-eared Bat and the Pipistrelle here at different times.

DENIS R. PACK-BERESFORD

Fenagh House, Bagnalstown.

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NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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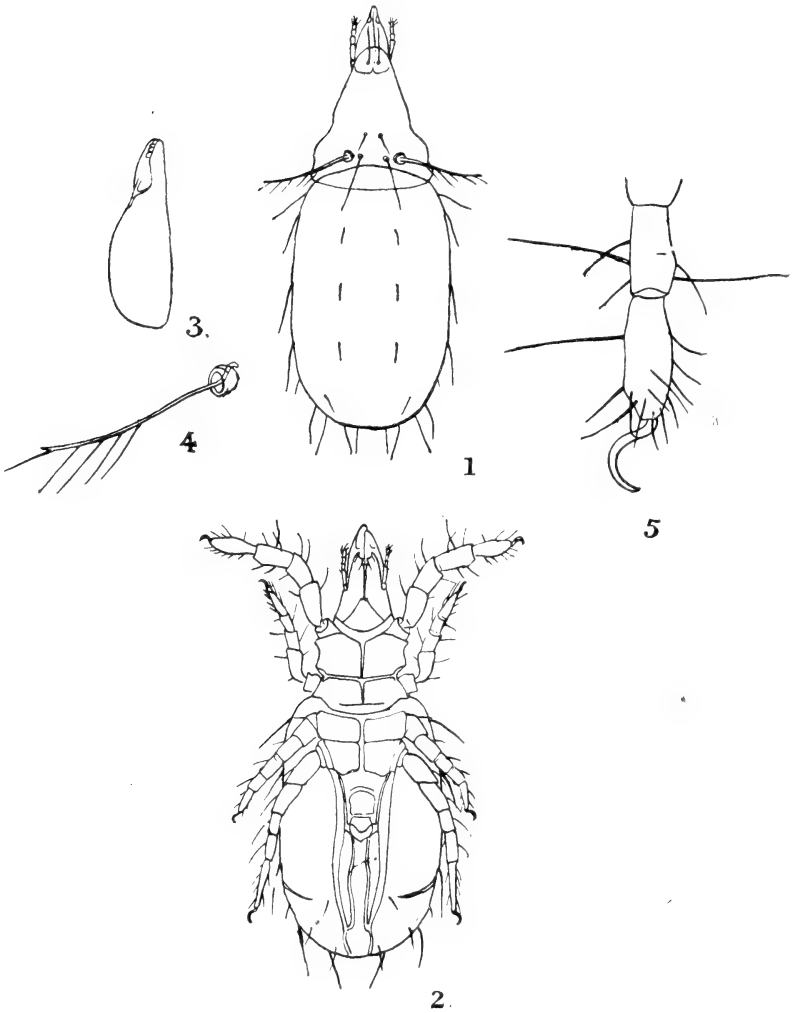
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" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
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" " 7	Fluke in Sheep.
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LOHMANNIA INSIGNIS, Berlese.
Co. Dublin.

A NEW IRISH MITE,
LOHMANNIA INSIGNIS, BERLESE.

BY PROF. GEORGE H. CARPENTER, B.SC., M.R.I.A.

(PLATE 7).

[Read before the Dublin Naturalists' Field Club, 14th November, 1905.]

IN June, 1904, I received from Mr. J. Bell, gardener at Tibbradden House, near Rathfarnham, Co. Dublin, seedlings of Kidney Beans with the roots badly gnawed on the surface. The work of devastation was due in part to springtails of the genera *Achorutes* and *Lipura*, and in part to elongate, light-brown mites, about 1 mm. in length, which were crawling over the roots, and biting up the epidermis with their chelicerae. The appearance and habits of these mites were suggestive of large Tyroglyphidæ, but microscopic examination soon showed that they possessed the peculiar pseudostigmatic organs (Plate 7, fig. 4) that characterise the Oribatidæ or "Beetle-mites," and that they must therefore be referred to that family. It soon became clear that they did not belong to any species described in Michael's well-known monograph of the British Oribatidæ¹, and I took the opportunity of showing specimens to Mr. Cecil Warburton, who happened to be in Dublin about that time. He expressed the opinion that they represented a species new to science, belonging or closely allied to Michael's genus *Lohmannia*.

About twelve months previously a number of Irish mites collected by Mr. J. N. Halbert and myself, had been sent for identification to Dr. A. Berlese, the eminent Italian acarinologist. A week or two afterwards he sent to us a copy of a paper² in which he had described from an Irish specimen the very species that was puzzling us! He had referred it to the genus *Lohmannia*, naming it *L. insignis*. I have given a short

¹ A. D. Michael. "British Oribatidæ," 2 vols. London (Ray Society), 1883-7.

² A. Berlese. "Acari Nuovi," Manipulus 3. *Redia*. vol. ii., 1904, pp. 10-32, pls. 1, 2.

account of the mite in a recent paper¹ and figured its principal details. The faunistic importance of the animal justifies, I believe, a somewhat fuller reference to it in this magazine, and by the courtesy of the Royal Dublin Society's committee of scientific publications I am able to reproduce (Plate 7) the figures.

The genus *Lohmannia* was formed a few years ago by Michael² for two continental species, one German, the other Italian, and Berlese has, in the paper just quoted, described two or three additional species from Italy. The genus is therefore new to the British Islands. Its species are remarkable among the Oribatidæ for their elongate, pale appearance, resembling the immature (nymph) forms of the typical, rotund and blackish members of the family, whose firm, dark cuticle has given rise to the term "Beetle-mites." In *Lohmannia* the abdomen is elongate; each short, stout leg terminates with a single claw, the second pair of legs being situated close to the first, and the fourth pair close to the third (Plate 7, figs. 1, 2, 5). The chelicerae (fig. 3) are powerful and well adapted for gnawing vegetable tissues. The dorsal plate of the abdomen is flexed far round on the ventral surface where it touches the lateral "cover" that bounds the anal and genital areas (fig. 2).

Dr. Berlese describes *Lohmannia insignis* as follows:—

"Terreo badio-fuliginea, abdomine vix pallidiore, pedibus laete badio depictis. Corpus elongatum. Anticum conicum, apice peracutum sat convexum. Abdomen ad dorsum planum, rectangulum, antice recte truncatum, postice rotundatum, pilis aliquot brevibus, simplicibus ornatum. Derma nitidum. Organe pseudostigmatica (ex pseudostigmis dorsualibus exorta), longa exilia ramusculis exilibus ornata. Pedes crassiusculi, fuscescentes, uniungues, tarsis anticis ovalibus, sat latis. Inter congeneres maxima."

The features which seem specially to distinguish *L. insignis* from other species of the genus are the simple bristles on the abdomen, and the slender, pectinate pseudostigmatic organs (fig. 4). It is not often that an animal, which forces itself on our attention by damaging cultivated plants, is found to be

¹ G. H. Carpenter, "Injurious Insects and other Animals observed in Ireland during the year 1904." *Econ. Proc. R. Dublin Soc.*, vol. i., pp. 281-305, p's. xxiii.-xxvi.

² A. D. Michael. Oribatidæ in "Das Tierreich." Berlin, 1898.

INSECTS AT ROSSES POINT, CO. SLIGO.

BY REV. W. F. JOHNSON, M.A., F.E.S.

MRS. JOHNSON and I spent the month of June at Rosses Point and devoted most of our time to collecting insects, which, however, were by no means as abundant as might have been expected, a state of affairs probably attributable to the cold, wet spring. Our collecting grounds were practically three, the sandhills and adjoining grass lands as far as Drumcliff Bay; the shore of Sligo Bay adjoining the coastguard station; and inland among low, juniper-clad hills. The first-mentioned was the most extensive and productive and claimed most of our attention.

LEPIDOPTERA.

Of butterflies I met with but four species, *Satyrus semele*, *Epinephele janira*, *Cænonympha pamphilus*, and *Polyommatus icarus*; the last-named was the most numerous and very fine and brilliant.

Three species of Ghost Moths were met with, *Hepialus lupulinus*, *H. velleda*, and *H. humuli*, the last two being very abundant. Numbers of the larvæ of *Arctia caia* were observed crawling about in the sandhills on the Bent, &c. I did not employ sugar, so we had to rely on our nets for any captures of moths, the only Noctuæ met with were *Miana fasciuncula* and *Habrostola triplasia*. Besides these we captured *Nudaria mundana*, *Fidonia atomaria*, *Melanippe subtristata*, *Coremia fluctuata*, several of the beautiful *C. pectinitaria*, a couple of *Thera simulata* at Juniper, *Emmelesia albulata*, *Eupithecia venosata*, a single specimen at *Silene maritima* (I think I was rather late for this species), *E. virgaureata*; *Pionea fuscalis*, *P. forficalis*, and *Scoparia ambigualis* were common in meadows; on the shore near the coastguard station there was a quantity of Bindweed growing, and here were numbers of the beautiful White Plume *Aciptilus pentadactylus*; they were very conspicuous in the grass at dusk and we secured a long series; they appeared to be just emerging from pupa. The only other Plume obtained was *Mimæsioptilus bipunctidactylus*. Among the Micro-lepidoptera the most noteworthy is

Cnephasia octomaculana taken on the shore near the coast-guard station flying at dusk: this appears to be an addition to the Irish list, as I cannot find any record of its previous occurrence. Besides this we captured *Heterogonomon icterana*, and *Penthina pruniana*, which occurred in some numbers, flying round blackberry blossom on a curious abrupt hill which had evidently in bygone days been a rude fortress, and which we found the country folk believed to be the haunt of fairies; *Sericoris cespitana* was in great numbers, and many varieties on the golf links and race course; and along with it *S. lacunana*, *Aphelia osseana*, *Xanthosetia hamana*, and *Tinea fuscipunctella* complete the list.

COLEOPTERA.

Beetles were fairly plentiful, and though the list is not a very long one it makes up for quantity by quality, as I have the pleasure of recording four species hitherto unrecorded from Ireland, as well as several additions to the records of the province and county.

The species new to the Irish List are *Philonthus lepidus*, *Stenus incrassatus*, *Platystethus capito*, and *Saprinus immundus*, all four were taken on the grassy land immediately behind the sandhills, the first and last in cowdung and the other two among the herbage.

Philonthus lepidus, Grav. which I have introduced above as an addition to our Irish List, seems to be very local. The only places where it has been taken in England appear to be Deal, where it was taken among Marram on the sandhills, and Lancaster, where it occurred in river refuse. Commander Walker, M.A., F.L.S., kindly compared my specimen with his taken at Deal, and tells me that it agrees well with them except that it is a shade larger. It is remarkable to find on the west coast of Ireland a beetle whose chief habitat is on the south-east coast of England. I should not, however, be at all surprised if it turned up in other suitable localities.

I have marked those new to Connaught with † and those new to Sligo with *, and I have omitted the very common species. *Notiophilus substriatus** exhibited a very small form, being only $3\frac{1}{2}$ mm. in length. Three species of *Dyschirius* were met with, viz.:—*D. impunctipennis*, *D. politus*, and *D.*

globosus; all were plentiful. *Amara bifrons**, *A. tibialis*†, and *A. familiaris**, were none of them plentiful, and were taken crawling about on the sand; in two places we took a large number of *Tachypus pallipes*†, one place was a large depression among the sandhills which might at one time have been a shallow lagoon, the other was the point at Drumcliff Bay; they were very numerous and very active but difficult to detect at first from their habit of remaining quite still beside a stone or a plant. Mrs. Johnson first detected them, but it took us some practice to find them with facility. This beetle has been recorded in Ireland from only one other locality, viz., Coolmore, Co. Donegal, where it was taken by Mr. Langham (*Irish Naturalist*, vi., p. 58).

I was very much disappointed about water-beetles, as I fully anticipated meeting with some good species in a place so well supplied with suitable localities, but the results of our efforts in this direction were meagre in the extreme, *Ilybius obscurus*† being the only one worth mentioning. Among the Hydrophilidæ I need only record *Laccobius minutus*†.

I was much pleased to find a specimen of *Xantholinus cribripennis*, Fauvel, among my captures at Rosses Point. This capture extends its range southwards. It has been already recorded from Magilligan, and Buncrana, where it was taken by the late Mr. Buckle, and from Coolmore, Bundoran, and the banks of the River Erne, near Ballyshannon, where it was taken by myself. It would be very easily overlooked in the field, for it looks very like the common *X. linearis*.

I was much surprised to find so few Staphylinidæ in seaweed, which is usually so prolific of them. Vainly did we turn and shake suitable lumps, the beetles were not there, and at last we gave it up. I may say that most of the "staphs" captured were taken in cow-dung. The most interesting were the following:—*Quedius rufipes**, *Philonthus intermedius**, *Ph. cruentatus*†, *Ph. sordidus*†, *Ph. quisquiliarius*, *Stilicus similis*†, *Bledius arenarius* (very abundant at the mouth of a little stream) *B. pallipes*† taken sparingly with the following in the sandy plain behind the sandhills and near to a small lake. I believe in winter this part is subject to flooding, and there were pools of water near which the *Bledius* were most numerous. This species has only been recorded once

previously in Ireland by myself from Ardara (*Ent. Mo. Mag.*, xxviii., pp. 310–311). *B. fuscipes*, *B. longulus*, *B. erraticus*, *Lesteva longelytrata*†, and *Homalium riparium* which exhibited some small forms. We found no burying beetles nor any Silphas except *S. subrotundata*, in fact this section was very poorly represented; we got a few *Hister carbonarius*† and *Saprinus æneus*† in cow-dung; *Coccinella xi-punctata* were evidently not emerged as we saw but few. Besides this I may note *C. vii-punctata*, *Rhizobius litura*, *Coccidula rufa*, and *Meligethes æneus*. *Aphodii* were fairly well represented, eight species being obtained, viz., *A. fossor*†, *A. fœtens*, *A. fimetarius*, *A. scybalarius*, *A. ater*, *A. pusillus*† (very abundant, has only been known from Antrim and Down *vide* Irish List¹, p. 731), *A. rufipes* and *A. depressus*. Other Lamellicorns were *Geotrupes stercorarius*, *Serica brunnea*, and *Ptyllopertha horticola*. Only one species of skip-jack was met with—the common but handsome *Corymbites cupreus*. *Donacia sericea* was very abundant on Iris in a little stream, and *D. simplex**, F. was taken on the shore of one of the lakes, and in the same locality *Phædon armoraciæ**, L. *Longitarsus* was represented by *L. jacobææ* and *L. lævis*†, both pretty plentiful on the sand-hills. Mrs. Johnson took a single *Nucерdes melanura*† on the point at Drumcliff Bay, and might have got more but that she thought it was *Telephorus fulvus*, to which it bears a resemblance. I had hoped to meet with the large white form of *Philopædon geminatus*, but could only find the type; *Poophagus sisymbrii** was captured by sweeping water-plants in the little stream mentioned above.

I have to thank Mr. J. J. Walker, F.L.S., for kind help with some of the critical species.

Acton Glebe, Poyntzpass.

¹ Johnson and Halbert, *Proc. R.I. Acad.* (3) vol. vi, 1902

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include six Silver Pheasants from Mrs. S. L. Low, two Chameleons from Miss MacDonnell, two Peacocks from Mrs. H. Devine, a Goldfinch and a Canary-finch from Mr. John Beers, and a Macaque Monkey from Mr. Edward B. Curzon. Four Jackass Penguins and two Cinereous Vultures have been purchased.

BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 9.—Excursion to Church Hill. A party of eighteen took train to Portadown, whence, being reinforced by some local members, they drove to the peat factory near Maghery, over which they were conducted by Mr. Garnet, managing director. On arrival at Church Hill the party was swelled by the arrival of fourteen members of the Tyrone Field Club. At Church Hill the leading feature proved to be the large nests of the Wood Ant (*Formica rufa*) which were studied with much interest. The best plant found was *Mercurialis perennis*, a new station for this rare species. The number of species of birds noted during the day was twenty-nine. Tea was served at Portadown, and a prize for the best collection of plants was awarded to W. H. Robinson, whose set numbered seventy-one species.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 7.—Arthur C. Muir, C.A., lectured on "Belfast Civic Undertakings."

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 23.—EXCURSION TO PORTRAINE.—Members and visitors to the number of twenty-six took the 12.30 train to Donabate. From there the party walked to the shore, where the Ordovician inlier was investigated under the conductorship of J. de W. Hinch, Hon. Sec. Great interest was shown in this striking development of volcanic activity and many typical specimens of porphyritic andesite were obtained. The coral reefs and graptolitic shales of the district also yielded good results. The party returned to Dublin after having tea at Portrairie Asylum.

OCTOBER 31.—ANNUAL CONVERSAZIONE.—The winter session 1905-06 was opened by a conversazione in the Royal Irish Academy House, which

was largely attended by members and visitors. The meeting commenced at 7.30 o'clock, and at 8.30, the Vice-President (C. B. MOFFAT, B.A.) took the chair and welcomed the visitors. Prof. COLLE then delivered a lecture on "A Student's Tour around Ireland," which gave an account, illustrated by lantern slides, of the annual tour of the agricultural students of the Royal College of Science. Messrs. W. H. PHILLIPS (President Belfast N.F.C.) and Nevin H. Foster, M.B.O.U., represented the Belfast Field Club at the meeting. During the evening a number of scientific exhibits were displayed, including the following:—R. M. BARRINGTON, F.L.S.—*Junco hiemalis* and *Hypolais polyglotta*, two birds new to Ireland. F. G. BELL.—Collection of photographs relating to natural history. Miss BERNARD.—Specimen of Russian *Convolvulus*. W. B. BRUCE.—Collection of Irish grasses. J. J. BUCKLEY.—Tonga clubs. F. W. BURBIDGE, M.A. (President).—Collections of Botanical Specimens. Prof. G. H. CARPENTER, B.Sc.—(a) Irish specimens of the Warble-fly (*Hypoderma bovis*) with eggs, larvæ, and puparia; (b) New Pycnogonida from the deep Atlantic region of the Irish marine area. Miss CONAN.—Collection of South African plants. H. K. GORE CUTBERT.—Lantern slides from photographs taken on D.N.F.C. excursion to Moorhill, June, 1905. J. DUFFY.—Gold-bearing quartz from Croghan Kiushelagh, Co. Wicklow. F. O'B. ELLISON, B.A. (a) Microscopic exhibit of young wood-louse entrapped in a utricle of *Utricularia*; (b) Illustrations of diffraction in microscopic objects. Miss ELMES, B.A.—Collection of rock-specimens and crystals from the St. Gothard, Switzerland. A. H. FOORD, Ph.D.—Scottish Carboniferous fossils. N. H. FOSTER, M.B.O.U.—Down feathers from nests of *Anatidæ* (12 species). W. F. GUNN.—Some diagrammatic statistics of the Club. W. F. GUNN and Miss WINIFRED GUNN.—Autumnal fruits. J. N. HALBERT.—(a) Irish Lepidoptera (Moths) from the collection of the Science and Art Museum; (b) *Arrhenurus neumani*, Piersig, a Water-mite new to the British Isles. J. A. HENDERSON.—Collection of rock-specimens from Co. Fermanagh. STANLEY W. KEMP, B.A.—Deep-water Echinodermata from the West Coast of Ireland. Prof. T. JOHNSON, D.Sc., F.L.S.—(a) *Spongophora Solani*, Brunch, a Potato Slime-fungus; (b) Stereograph from the Botanical Collection, National Museum. Miss M. C. KNOWLES.—(a) Leaves from a white deposit underneath a cut-away bog. Drumshambo, Co. Tyrone; (b) Collection of casuals from Straffan, Co. Kildare. [Both from Botanical Collection National Museum.] Miss M'ARDLE.—Set of Irish flowering plants yielding dyes. [From the Botanical Collection, National Museum.] F. NEALE.—Nest of Long-Tailed Tit from Mulhuddart, Co. Dublin. A. R. NICHOLS, B.A.—(a) Eggs of Chilean Tinamou (*Nothoprocta perdicaria*); (b) Eggs of Pentland's Tinamou (*Tinamotis pentlandi*), Chili. GEO. H. PETHYBRIDGE, Ph.D., B.Sc., and R. L. L. PRAEGER, B.A., B.E.—Map showing distribution of vegetation in district south of Dublin. GEO. H. PETHYBRIDGE, Ph.D., B.Sc.—Field maps, showing progress of Vegetation Survey in district north of Dublin. R. L. L. PRAEGER, B.A., B.E.—Some rare plants collected last season in

Clare, Mayo, Leitrim, Cavan, and Monaghan. R. F. SCHARFF, Ph.D., M.R.I.A.—Some animal remains obtained during the excavations for the foundations of the new College of Science in Dublin. HENRY J. SEYMOUR, B.A., F.G.S.—Geological photographs from North Donegal and Lambay Island. R. C. SIMPSON.—(a) *Banksia aiba* (Bottle Brush), New South Wales; (b) *Xylomelum pyriformis*, Native or Wooden Pear, New South Wales. EDWARD WILLIAMS.—(a) Specimens of Greenland Falcon (*Falco candicans*), and Iceland Falcon (*Falco islandus*); (b) Ruffs (*Machetes pugnax*) in various stages of plumage.

LIMERICK FIELD CLUB.

NOVEMBER 1.—ANNUAL MEETING.—H. V. Moroney, B.E., President, in the chair. The President delivered an address on "Field Club work, and what it includes." The Annual Report was read by J. F'G. Windle, Hon. Secretary, and contained the following:—The membership shows an increase of 8, being 125 as against 117 last year. The Committee regret the loss, through removal to Cork, of R. A. Phillips, one of the Club's most active botanists. The winter programme, as carried out, was as follows:—NOVEMBER 3—Annual meeting and exhibition of scientific objects. &c. NOVEMBER 15—Account of the Sligo Field Club Conference, by R. Lloyd Praeger. Attendance, 60. DECEMBER 16—"Microscopic Animal and Vegetable Life," by Rev. J. H. Thomas, B.A. Attendance, 50. JANUARY 17—Photographic night. Attendance, 30. JANUARY 31—Short papers and exhibits, including "Design," by Miss Alice Doyle; "*Leucosium æstivum* and its habitat around Limerick," by R. D. O'Brien, and additions to the Limerick flora by R. A. Phillips. Attendance, 30. FEBRUARY 21—"Rocks and Rock Structures," by H. J. Seymour, B.A. Attendance, 50. MARCH 14—Forests, wild and cultivated, by Augustine Henry, M.A. Attendance, 56. MARCH 28—Rambles in Desmond and Thomond with a Photographer, by P. J. Lynch. Attendance, 65. Three excursions were held during the summer—to Adare on June 8, to the Glen of Aherlow and Ballinacourty on July 20, and to Rathkeale and Knockfierna on August 10. The Club "Journal" was published in August at a cost of £20 12s. As regards finance, a small credit balance is carried forward, and the Committee make another appeal on behalf of the O'Curry Memorial Fund. During the year the Club has lost two members by death—G. J. Hewson, M.A., and Mrs. Goggin. The report and accounts were adopted. The following executive for the ensuing year was elected:—President, J. F'G. Windle; Vice-Presidents, H. V. Moroney, P. J. Lynch; Committee, Mrs. Gibson, J. F. Gaffney, E. H. Bennis, W. J. Fogerty, B. Barrington, Rev. J. H. Thomas, W. M. Beauchamp. Hon. Treasurer, Joseph Stewart. Hon. Secretaries, George Fogerty, Miss Alice Doyle. Journal Committee, Rev. James Dowd, P. J. Lynch, George Fogerty.

R. J. USSHER subsequently lectured on "What the Caves teach us."

NOTES.

BOTANY.

New County Records for Monaghan and Fermanagh.

Towards the end of July last, while on a visit to my friend the Bishop of Clogher at Bishopscourt, near Clones, we made a rather careful survey of the grounds and the adjacent bog-land, with the result that five new species were added to the flora of Monaghan, No. 32 of the Irish botanical vice-counties. In the grounds quite close to the house we found *Leontodon hirtus* and the rare sedge, *Carex strigosa*; in the bog *Andromeda Polifolia* appeared in considerable quantity, associated with *Rhynchospora alba*, while *Veronica montana* was found in abundance in a shady lane leading towards the Ulster Canal. Adding to these the Toothwort (*Lathræa squamaria*), which was observed in Bishopscourt wood in the spring of the year, the total of new records for Monaghan from this small area is brought up to six. Evidently the flora of Monaghan has been but imperfectly explored.

A day spent in ascending Cuilcagh from Belcoo, by way of the Marble Arch, was very disappointing in its botanical results, since it added but one new species to the flora of Fermanagh, vice-county No. 33. Although it attains to a height of 2,188 feet, and has a considerable extent of cliff-surface facing north-east, and in some points reaching to fully 1,900 feet, Cuilcagh yielded a very poor flora. At 1,000 feet *Listera cordata* appeared; at about 1,600 feet *Vaccinium Vitis-Idæa* and *Hymenophyllum unilaterale*; at 1,800 feet *Polypodium Phlegopteris*, and *Saxifraga stellaris*; and, sole addition to the Fermanagh flora of all the plants on this north-eastern face of the mountain (which belongs entirely to that county), *Lycopodium clavatum* turned up in some quantity on grassy slopes at 1,400 feet. Returning to Clones from Belcoo by rail next morning, another addition to the Fermanagh flora was observed at Lisnaskea station, where that pushing alien, *Matricaria discoidea*, appeared on the permanent way. This record brings up to 24 the total of Irish county divisions in which this species has appeared.

N. COLGAN.

Saudycove.

Limerick Plants.

To the current number of the *Journal of the Limerick Field Club* (June, 1905), Mr. R. A. Phillips contributes a readable article on "Some notes on the Flora of Limerick." The best plants new to the district which are mentioned are *Polygonum mite* and *Carex aquatilis*, the former not found previously in Ireland south of Leitrim, nor the latter south of Dublin. The proof-reader has hardly done justice to the paper, and the generic names *Lynohnis* and *Hieraciuns* strike us as unfamiliar. The paper is illustrated by a plate made from an excellent photograph by Dr. George Fogerty of *Leucojum æstivum* growing in the Ballinacurra marshes—a plant of which we hope to hear more from Mr. Phillips and others.

To the same number Mr. R. D. O'Brien contributes some botanical notes, chiefly on the distribution and standing of *Leucojum*.

Plants of the Cavan Lakes.

Last August I spent a little time in the lake country lying between Cavan and Belturbet. There are innumerable small lakes here, all drained by the River Erne, which flows as a broad winding sluggish stream through the country, often assuming a lake-like form. The botany of this Upper Erne district is little known, though David Moore did some exploration about Belturbet, and three of the rarer plants which I found—*Hydrocharis morsus-ranae*, *Carex pseudo-cyperus*, and *Lastrea Thelypteris*—already stood recorded from the district in his name. Of the plants I mention, some dozen are new to Cavan, and half a dozen to the Erne basin.

Of species frequent about this lake country, *Ranunculus Lingua*, *Myriophyllum spicatum*, *Callitriche autumnalis*, *Cicuta virosa*, and *Potamogeton heterophyllus*, are worthy of mention. The following also occurred each in several stations—*Sium latifolium*, *S. angustifolium*, *Hydrocharis morsus-ranae*, *Cladium Mariscus*, *Carex teretiusecula*, *C. pseudo-cyperus*. The little Bun Lough, south-east of Belturbet, proved a productive spot. Here grew *Rumex Hydrolapathum*, *Juncus obtusiflorus*, *Sparganium minimum*, *Chara polyacantha*. In drains extending thence to Tonawally Lough *Lemna gibba*, rare away from the sea, was present in vast quantity; and along a hundred yards of the eastern shore of the lake *Lastrea Thelypteris* flourished in greater profusion than I had seen before, forming a miniature forest thirty feet in breadth, with a height of up to two feet. Annagh Lough yielded, in addition to other plants, *Potamogeton Zizii* and *Isoetes lacustris*, both new to Cavan. The following may also be mentioned:—*Polygonum minus*—plentiful by one of the arms of Lough Oughter; *P. mite*, Shantemon L., and a puzzling form which Mr. Bennett is inclined to refer to the same species is abundant by L. Oughter, west of Devon Cottage; *Juncus diffusus*—by Shancorn Lough (the fourth Irish station); *Potamogeton obtusifolius* var. *fluvialis* Lange and Mort., Beaghy L.; *Carex filiformis*, lake-side north of Devon Cottage; *Glyceria plicata*, Tonawally Lough.

The Mints of this district are varied and puzzling. Mr. Bennett made the following determinations:—*M. hirsuta* var. *nederheimensis* Strail?, Shantemon L.; *M. sativa* var. *paludosa*, Annagh L.; *M. gentilis*, Lough Oughter.

R. ILLOYD PRAEGER.

Dublin.

***Epilobium alsinefolium* in Co. Leitrim.**

Mr. Praeger's note on *Epilobium alsinefolium* in the *Irish Naturalist* for October suggests a long delayed notice of an incident regarding its discovery in Glenade. Mr. R. P. Vowell and I were botanizing together on the cliffs in the beginning of July, 1884, having received a small grant from the Royal Irish Academy for exploring the Ben Bulbin range. Mr. Vowell drew my attention to a couple of large beds of an *Epilobium* which was not in flower. I pulled a few bits and threw them away,

saying, "only *montanum*." However, on again looking at the plant and observing its somewhat brittle stem with shining greasy-looking leaves, I became reconciled to Vowell's opinion that it might be something else, and we collected more. Returning to Dublin, anything out of the common was, as usual, shown to my old friend, Mr. A. G. More; he at once decided that the *Epilobium* might be *alsinefolium*, and said, "Send it to Baker at once." This was done, and Mr. J. G. Baker not only confirmed More's suspicion, but said the plant was undoubtedly *E. alsinefolium*. On the facts above stated it is clear that it was Mr. R. P. Vowell who really detected this interesting plant for the first time in Ireland, and not myself.

It may be readily confounded with *E. montanum* when not in flower, and Syme, in Sowerby's "English Botany," 3rd Edition, says under this species, "The figure in Engl. Bot., No. 2000, certainly does not represent *E. alsinefolium*. It seems to me a broad-leaved form of *E. obscurum*, but possibly it may have been taken partly from *E. obscurum* and partly from the small mountain state of *E. montanum*." See also "Notes on the drawings for 'English Botany,'" by F. N. A. Garry: *Journal of Botany*, July, 1903.

R. M. BARRINGTON.

Fassaroe, Bray.

ZOOLOGY.

Irish Deep-water Schizopods.

In a report of the Schizopods collected by Mr. George Murray during the cruise of the "Oceana" in 1898 (*Ann. Mag. Nat. Hist.*, (7) vol. xvi., 1905, pp. 1-10, pls. i, ii.), Messrs. Holt and Tattersall describe and figure two new species, viz.: *Katerythrops oceanae* and *Gnathophausia drepanophora*. These were obtained in deep water, about 200 miles west of Valentia, in a tract which lies partly within and partly without the Irish marine area.

Lepisma saccharina at Portadown and Poyntzpass.

A specimen of this Apteron was sent to me by a friend from Portadown with a request for information respecting it. As I was quite unacquainted with it I sent it to Mr. J. N. Halbert, who very kindly identified it for me.

In Professor Carpenter's note on the Aptera of Belfast district (Guide to Belfast: British Association, 1902, p. 216), he gives this species as recorded by Templeton from Cranmore, which is now part of Belfast. I cannot find any other record of its occurrence in Ireland. My friend found the insect in his kitchen and I have found it in mine. I should be very glad of any information respecting its habits. Mr. Halbert informs me that, as far as he knows, it is not injurious.

W. F. JOHNSON.

Poyntzpass.

[*Lepisma saccharina* occurs in some Dublin houses, and I have received specimens from Mr. R. J. Ussher, taken at Cappagh, Co. Waterford. Probably the insect is widely distributed in Ireland. It may occasionally devour food-stuffs, but I believe its usual food is old paper and wood-work.

G. H. C.]

Phyllodromia germanica at Poyntzpass.

I was very much surprised to find a specimen of this cockroach in my dairy. It had evidently been brought in an egg box from London, for I had just opened the box previous to observing the insect. I am the more confirmed in this opinion as Mr. Eland Shaw, F.E.S., in his Synopsis of the British Orthoptera (*Ent. Mo. Mag.*, xxv., p. 370), states that he has met with it in large numbers in London restaurants, and in the Zoological Gardens; and the same gentleman records it from Lincoln (*Ent. Mo. Mag.*, 2nd Series, vol. xiv., p. 92). It appears to be a native of woods in Central Europe. This occurrence gives a good example of the manner in which insects are spread.

W. F. JOHNSON.

Poyntzpass.

[Some years ago I saw *Phyllodromia germanica* swarming in the kitchen of a certain Dublin hotel; I have also received it from Strabane.

G. H. C.]

Convolvulus Hawk-moth at Sligo.

In *Nature* of October 27th, 1904, the Rev. J. Meehan recorded the capture of a "Striped Hawk-moth" at Sligo. Having been recently in correspondence with Father Meehan on the subject, I learn from him that the insect is not (as might be inferred from the above name) *Deilephila livornica*, but a worn specimen of *Sphinx convolvuli*.

GEO. H. CARPENTER.

Dublin.

Geomalacus maculosus on Deenish Island, Co. Kerry.

While ashore on Deenish Island on July 22nd, a friend drew my attention to a slug which he had found. The specimen proved to be *Geomalacus maculosus*, Allman, the Kerry Spotted Slug. This species has several times been taken on the mainland near Derrynane, but, so far as I know, has not hitherto been found on any of the islands.

STANLEY W. KEMP.

Dublin.

Occurrence of a Numb Ray in Dublin Bay.

The Torpedo Fish (*Torpedo nobiliana*) or Numb Ray, as it is locally called by fishermen, is the only species of electric fish we possess in Irish waters. It is rarely obtained, being really a southern species which has extended its range northward as far as the British Islands. A specimen was caught a few weeks ago in Dublin Bay by a trawler. The spiracles were unfringed, and the colour of the back was of a reddish grey with a few darker spots scattered about here and there. It was a female fish measuring 2 feet 9 inches in length and 1 foot 8 inches in width. The weight was 25 lbs.

R. F. SCHARFF.

Dublin Museum.

Fox Shark in Sheep Haven, Co. Donegal.

The Rev. A. G. Stuart, of Ballymore, Letterkenny, kindly sent me the photograph of a large fish which was caught in a net by fishermen in Sheep Haven. The forked tail, the upper branch of which is extremely elongated, also the general shape of the body and pectoral fin pointed clearly to the specimen belonging to the Fox Shark (*Alopias vulpes*). The fish measured 15 feet 10 inches according to Mr. Stuart. The largest Irish specimen hitherto recorded measured only 14 feet in length.

R. F. SCHARFF.

Dublin Museum.

Ornithological Notes from Londonderry.

From reports I had received from time to time I had reason to believe that the Grasshopper Warbler (*Locustella naevia*) was a visitor to our district, but it was only this year that I had the pleasure of seeing the bird, and hearing its characteristic song. Mr. Thos. Gibson found it last May near his garden at Altnafoyle, within a mile of our city.

A second Greenland Falcon (*Falco candicans*) has turned up on the Donegal coast. One was shot at Horn Head, and reported in the *Irish Naturalist*. Another was shot at Glenties, about 25th October. I had the pleasure of examining it. It was a mature female, in the beautiful white plumage.

The Shoveller (*Spatula clypeata*) has increased very much as a breeding species at Lough Swilly of late years. Last spring fifteen nests were found in one field on the slob-land near Inch.

The Sheld-duck (*Tadorna cornuta*) also seems to be on the increase. Larger numbers are now annually seen on Lough Swilly and Lough Foyle.

The Quail (*Coturnix communis*), bred within a few miles of Derry in 1904; and again this year they were reported from the same place, and from another locality. I think of late years the Quail has been a regular

visitor to this district. I had the pleasure of acquiring for our City Museum a specimen of the rare Rednecked Grebe (*Podiceps griseigena*). It was shot at Lough Swilly in 1875 by Mr. John Bond.

D. C. CAMPBELL.

Londonderry.

Decrease of Crossbills.

Since 1889, when the first nest was found here, Crossbills bred annually, and were to be seen almost daily, summer and winter, except at certain times, when they probably wandered away for a few weeks at a time.

Their breeding-haunt has been a grove of old Scotch firs on a hill-top, but their distinctive call-note of "Gip, gip," was to be heard in all directions as they flew overhead; they daily visited running water, or the eave-shoots of my house, from which they drank when there was water in them.

In the end of March, 1904, two Crossbills' nests were found; one of these was examined on 17th April, and was found to contain young which had recently been killed, and the brains of one of them picked out. I sent them to Mr. Edward Williams, who suggested that they had been killed by a Squirrel, as the nature of the wounds appeared to have been caused by biting.

Since then Crossbills have almost disappeared, and through the breeding season of 1905 they were absent from their favourite haunts. They have been once observed near my house on 7th November, but that is the only observation of them made here this year.

This lack of Crossbills coincides with a rapid increase of Squirrels, animals that were formerly unheard-of in this county. In May, 1899, we saw the first of them, and then a Squirrel about once a year, until the last couple of years, where they have built through the plantations, and may be seen daily in every direction.

I should like to know if Crossbills have disappeared in other parts of Ireland where they settled after their great immigration, or increase, in the later eighties, and if there is any reason to think that the increase of Squirrels observable in so many localities may have contributed to this decrease of Crossbills.

R. J. USSHER.

Cappagh.

Quail in Co. Waterford.

On 6th June, 1905, I heard a Quail calling distinctly in a meadow at Ballynamedagh. The last time I had heard it in this district was on 11th July, 1888.

R. J. USSHER.

Cappagh.

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Department of Agriculture and Technical Instruction for Ireland.

DUBLIN MUSEUM.

MUSEUM DEMONSTRATIONS, 1905-1906.

Demonstrations or Informal Lectures, intended to direct attention to some of the most interesting parts of the Collections will be given in the Museum during the Winter. The following will be given on Tuesday afternoons and will be followed by others of which due notice will be given.

Dec. 5	Col. G. T. Plunkett, C.B.,	NEW OBJECTS IN THE MUSEUM.
" 12	Mr. Nichols, M.A., M.R.I.A.,	ANIMALS OF THE SEASHORE.
" 19	Mr. Brenan, R.H.A.,	LACE.
Jan. 9	Mr. Halbert,	INSECT ENEMIES OF DOMESTI- CATED ANIMALS.
" 16	Mr. Alabaster,	JAPANESE BRONZE.
" 23	Professor Cole, F.G.S.,	THE GROWTH OF A MINERAL.
" 30	Mr. Dudley Westropp,	PEWTER.
Feb. 6	Prof. Johnson, D.Sc., F.L.S.,	THE PLANTS IN SHAKESPEARE'S PLAYS.

The Demonstrations will commence at 4.35 p.m., and Visitors are requested to be in the Museum by 4.30 p.m.

Tickets free on application, at the Office in Leinster House, Kildare-street.



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